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Good Prospects For Last Half

Steel Market After Remarkable Six Months in Output and Shipments Faces Favorable Conditions—Mills Sold Months Ahead, Tonnage Being Readily Absorbed and New Buying Is Growing—Railroads Place Liberal Orders

SIX months of remarkable production and prosperity finds the steel industry entering the second half of the year with practically undiminished prospects. Most of the more important producers have order books so large as to insure the continuance of present conditions until well into the fourth quarter; some, notably at Chicago, are virtually filled to the year's close. Furthermore, new tonnage is showing a tendency to expand and is expected to develop increasing volume. The outstanding fact is that consumption has taken up the greatest half-year tonnage of iron and steel, by a considerable margin, ever produced in this country and no signs are yet appearing of a consequential slackening of total demand, except where normal seasonal influences have had their effect.

New inquiries of importance this week have brought delivery promises of four to five months from leading makers of plates, shapes and bars. Other mills which have not sought to accumulate such large order books are comfortably filled and are getting new tonnage more freely. Eastern mills especially are experiencing this improvement in new business. Quotations in tubular goods run to five months. Present tin plate obligations cannot be discharged in the third quarter. This is also the case with wire and wire products. Both sheet and tin plate production is being reduced 10 per cent or more by hot weather and the shutting down of many plants, this week until over the Fourth, will further cut into the available tonnage.

Roads Still Buying

Railroad buying has again been prominent this week except in equipment where the market is lifeless because of the fact that car and locomotive shops are filled for months ahead. The Pennsylvania has placed 15,000 and the Reading 10,000 tons of rails additional for this year. The Illinois Central is inquiring for 60,000 tons and the Pere Marquette for 6000 tons. The New York Central is seeking 7000 to 8000 tons of steel for shop needs, the Big Four 1500 to 2000 tons for similar purposes and the Pennsylvania has just bought 5000 tons more. The $2 extra on heavy rails quoted by the Bethlehem Steel Co. has been withdrawn temporarily.

Iron Market Backward

Maneuvering of pig iron producers and consumers for market advantage continues. The volume of inquiry and buying is better though not liberal. Quiet sounding of conditions by buyers is more prevalent. Prices still soften. They are $1 lower at Chicago and 50 cents down at Pittsburgh and in the East. The offering of iron at $25 Birmingham by smaller producers has not broken the southern market. The larger sellers still ask $27 although $26 has been named.

IRON TRADE REVIEW composite of 14 iron and steel products continues to be put down by the falling pig iron market. This week it is $46.16. Last week it was $46.34. The composite now has declined for seven consecutive weeks.

Miscellaneous proposals involve much tonnage. The 24,000 tons of steel for the Hetch Hetchy aqueduct will be furnished by the Steel corporation and the Bethlehem Steel Co. A 7000-ton wire requirement for cables and 1700 tons for anchorages for the Delaware river bridge at Camden soon will be up. An 83-mile pipe line is under negotiation at Cleveland. The week's general contracts included a 4500-ton approach for vehicular tunnel at New York.

Steel prices are steady and show no tendency to dip below the Steel corporation or minimum schedule except in black sheets. The market on semifinished steel now is down generally to $42.50. The recent purchases of 25,000 tons of sheet bars by the Steel corporation were above this figure but this buyer has been quoted such a price since.

French Dump By-Products

Dumping by the French in neutral markets of large quantities of coal tar products accumulated from German operations in the Ruhr has reacted unfavorably upon conditions in this country. This interference with export demand, in conjunction with the heavy operations of by-product coke works has caused a backing up of supplies of benzol, napthalene and sulphate of ammonia in the hands of producers and the spot market has weakened sharply.

Business Trend and Chart Section Page 1873

Pig Iron Buying Still Delayed

More Sounding Out of Situation, However, Is Apparent—Prices Continue To Show Softening Tendency—Larger Southern Makers Not Following $25 Price —Czecho-Slovakian Iron Offered in the East

PITTSBURGH, June 26.—A sale involving about 1100 tons of basic pig iron was consummated this week at $27, valley, establishing the market quotation 50 cents per ton lower than one week ago. But for this sale, buyers are pursuing the same disinterested course of several weeks past. The present inquiry for basic involves 2000 tons upon which $27, valley, was quoted. The quietness in basic is likely to exist for a few weeks in view of the determination of some consumers to make every effort to buy at a lower figure. The price of $26.50, valley, is heard on basic but as there are no sales to back up this rumor, nothing lower than $27, valley, is recognized here. No large sales of No. 2 foundry iron are recorded in the market this week nor is there any large inquiries in circulation. Small lots of foundry iron are being purchased at $27 to $27.50, furnace, for the No. 2 grade (1.75 to 2.25 silicon). In this connection the Pittsburgh Valve Foundry & Construction Co. closed on 300 tons of No. 2 foundry at $26.50, Johnstown, for lower and $27 for higher silicon. One producer is quoting $27, valley, for this grade on what inquiries are being made. Some producers, however, say they will proceed to pile more foundry iron whenever the market recedes below $27.50, valley. The Westinghouse Electric & Mfg. Co., is in the market for 750 tons of No. 1 and No. 1X foundry iron for its Cleveland plant upon which $28.50 and $29, valley, respectively, was quoted. A small lot of copper free low phosphorus iron was sold here last week at $33, f.o.b. eastern Pennsylvania furnace. The valley quotation on this grade continues at $35, valley. Bessemer iron in small lots is bringing $28, valley and malleable is quoted at $27.50 to $28, valley, a recession of 50 cents from a week ago and gray forge at $26.50 to $27, valley.

Buying Seems No Nearer

Boston, June 26.—Pig iron sales in New England during the past week have been exceedingly scarce. Dealers for the most part report having sold two or three cars each and inquiry is practically at a standstill. A New Hampshire foundry is in the market for 300 tons, 100 of each of three silicon grades, and an eastern New England consumer for 200 tons, but other than these requests there is practically no formal inquiry. Foundries continue busy and in several districts more molders are urgently needed. Stocks of pig iron, however, appear to be sufficiently large to make most consumers independent of the present pig iron market, and while prices have held about stationary during the past week an impression is growing in the trade that prices will further decline. Several of the small sales of the week were eastern Pennsylvania No. 2X (2.25 to 2.75 silicon), at $29 furnace. Buffalo furnaces are quoting $28.50 for this same grade, but probably would go $28 on a round tonnage. Virginia furnaces still hold to $28 base, although here and there slight concessions below this figure are rumored. The Alabama furnaces usually shipping into New England are holding firm at $27, Birmingham, despite rumors of $25 and $26 iron.

More Inquiry in East

Philadelphia, June 26.—The pig iron market in this territory is somewhat easier. Foundry iron is quoted $28.50 to $29, base, nearest furnace, plus $1 silicon differentials. There is inquiry and the feeling is cheerful. It is generally expected the market will settle somewhat lower. Current inquiry involves fully 5000 tons, most for prompt delivery. A fair amount of third quarter purchases by a large pipe interest about 10 days ago has had a stimulating effect. This interest took 15,000 to 20,000 tons of which about 5000 was domestic pipe iron at $28 to $28.50, delivered, this district, and the remainder was foreign iron. Low prices recently quoted on some foreign iron have been withdrawn in some instances. Included in recent offerings was some Czecho-Slovakian iron.

More Interest Noted

Buffalo, June 26.—Inquiry for pig iron has picked up and a little more interest is being shown, but sales remain light. The market is $28 to $29 with reports of some tonnage going at $29.50. It is difficult for most sellers to get above $28 for future shipment of No. 2 plain (1.75 to 2.25 silicon) and $28.50 to $29 for prompt iron. Total inquiry in the week was for 2830 tons and sales are estimated at 2000 tons. Some buyers have not yet contracted for their third quarter requirements. A railway equipment interest in this territory is inquiring for 2000 tons of basic.

Little Improvement Noted

Cleveland, June 26.—Sales and inquiries in the pig iron market generally continue in small volume and prices offered to buyers in this vicinity are at least 50 cents lower than a week ago. One of the largest merchant interests among the northern Ohio sellers reports having booked slightly more tonnage during the week than in the week preceding, and receiving more inquiries. Another maker took less than 1000 tons, though active in soliciting business. Sales in two other instances were confined to a few hundred tons. A lake furnace has reduced its price to $29.50 and $30, furnace, equivalent to $30 to $30.50 for local delivery. Valley interests are offering iron at $27, furnace, equivalent to $28.17, delivered, and it is generally believed that less than that figure could be developed on a round tonnage. The Westinghouse Electric & Mfg. Co. is in the market for 500 tons of mixed grades for its Cleveland plant. A few small inquiries are pending for high silicon iron for northern Ohio users. The inquiry for 1400 tons of iron, comprising 400 tons of foundry iron and 900 tons of malleable for a South Bend, Ind., plow manufacturer had not been closed with any of the makers in the northern Ohio group up to Tuesday. The majority of furnaces report that buyers still are insistent on receiving all the iron they contracted for, though certain ones will carry over tonnage, and in some quarters furnaces are beginning to pile iron. The arrival of low-priced foreign iron, some makers fear, may have an effect indirectly on the market here, as sales of the iron in the East will lessen the customary demand on Buffalo and western Pennsylvania iron and create a larger supply to be disposed of in this territory. A little more interest is noted in basic iron, one furnace with headquarters here having received an inquiry for 2000 tons of this grade for a New York state coupler manufacturer. A lot of 1000 tons of off-grade basic iron was sold in the week to a Pittsburgh consumer at $26, valley furnace. One valley maker of basic is holding for $27 a ton.

A malleable castings company is in the market and is expected to buy about 5000 tons.

Larger Sellers Hold $27

Cincinnati, June 25.—Two local sellers during the past week were authorized by their southern furnace connections to accept limited tonnages for third quarter delivery at $25, Birmingham base. With the exception of the Tuscaloosa, Ala., and the LaFollette, Tenn., furnaces, however, all other southern furnaces continue to name $27, base. This means all the larger producers which represent the great bulk of the market. Some of the makers are filled with orders 90 days ahead. The southern Ohio market is unchanged, furnaces quoting $28 to $29, Ironton base. Demand for third quarter iron is appearing in larger volume and fair sales for that delivery have been made during the past week. However, buying in small lots for prompt delivery still is the feature of the market. In some instances, melters negotiating for third quarter requirements, are requesting shipment during the next 30 days.

Two leading sellers report receipt of requests for quotations on at least 15,000 tons of iron. Another seller is negotiating with a melter whose requirements for third quarter will aggregate several thousand tons. An Indiana melter is inquiring for 1500 tons of malleable and 3000 tons of basic for July shipment. From Michigan comes another inquiry for 1000 tons of malleble for shipment beginning Aug. 1. The Ross-Meehan Foundries, Chattanooga, Tenn., is inquiring for 800 tons of northern or southern foundry iron for last quarter, while a consumer at Rich-

mond, Ind., wants 600 tons of northern foundry for third quarter. The most important sale during the week was 320 tons of southern iron to a southern Indiana melter for prompt delivery. A Dayton consumer who closed for 600 tons of low phosphorus iron last week came back for an additional 200 tons.

More Sales at St. Louis

St. Louis, June 26.—Purchasing of pig iron is in larger aggregate volume than in a number of weeks. In addition to sales the inquiry, especially for small lots, has developed distinct improvement. Many interests which are specifying small amounts intimate that they are in need of more iron and will buy if the right terms are offered. Prices are softer, No. 2 southern iron having been quoted at $25 Birmingham, by at least one producer, while northern iron of the same grade can be had at $29.50. Leading southern makers, however, still hold at $27. The leading local producer has reduced its quotation from $32 and $33, to $30 and $31. Recent transactions were on a basis of the lower prices, for northern and southern iron. A Quincy, Ill., melter, who was inquiring for 1000 tons for the fourth quarter was unable to make arrangements as desired for this quantity, and has purchased 500 tons for third quarter at a figure reported to be equal to $25, Birmingham. An Indiana melter took 300 tons, and other sales ranging from carloads to 150 tons bring the total for the week to approximately 5000 tons. Offerings are freer, and selling agencies are making more intensive effort to place tonnages. The demand centers almost exclusively in foundry and malleable grades, little being heard from the steelmakers. The latter, however, are consuming heavy tonnages and are expected to be in the market during the next few weeks. Stove plants in this district will close July 4 for two to four weeks to make repairs. Jobbing foundries report some improvement in new orders, and are running from 60 to 80 per cent of capacity.

Still Quoting $27

Birmingham, Ala., June 25.—Pig iron in the Birmingham district still is quoted at $27 for the No. 2 foundry grade by the leading producers. The sale of a little No. 2 foundry iron at Lafollette, Tenn., at $25.50, Birmingham, and of about 5000 tons by a small maker in this state at $25 per ton, has had only a limited effect on the market. Inquiry fails to develop direct information as to any large producer selling under $27. Sales are light. Activity at furnaces, however, is unabated. No iron is being placed on furnace yards, and in the Birmingham district there is no piling of iron at consumers' plants. Shipment of pig iron from blast furnaces on the Tennessee river in the vicinity of Sheffield and Florence is showing a slight gain, as consumers in the Middle West are urgently demanding delivery. The labor shortage at furnaces has eased up a little, though foundries and steel mills still need men. Local consumption of pig iron shows no change. Makers of pressure pipe are getting in a little business, and sanitary pipe plants note

(*Concluded on Page* 1852)

Coke Demand Still Light

Furnace Interests Continue To Defer Action—Buying by Foundries More in Evidence in Some Districts

COKE PRICES, PAGE 1853

Pittsburgh, June 26.—Demand for furnace coke is lacking. Offers of tonnage bring $4.50 to $5, ovens, but sales are comparatively few. One consumer purchased about seven carloads at $5.15, ovens, including commission. Action continues to be deferred by several furnace interests which are unprotected on their third quarter requirements. This condition likely will continue until more interest is shown in the pig iron market. The impression is gaining ground that a number of important consumers of beehive fuel prefer to take advantage of the spot market until they determine definitely whether business conditions warrant the continuing of their stacks in blast. The price of $5.50, ovens, still is quoted on contract fuel by the majority of producers. Standard selected 72-hour foundry coke is offered at $5.50 to $6 for spot shipment. Some producers are asking $6 to $6.50, ovens, for this grade, on forward business, while others are quoting $7 to $7.50. One consumer of standard selected 72-hour fuel in the East closed on his last half requirements with a producer in this district at $6.50, ovens. Another sale is reported at higher than this figure although details are lacking. Production, according to the *Connellsville Courier*, for the week ended June 16 was 302,400 tons compared with 295,640 tons the preceding week.

Curtails Production

Boston, June 26.—The local by-product ovens have curtailed production and this has slowed down shipments. New demand is not urgent. Most foundries are holding their own in production and requests for shipment on contract are fair. Connellsville coke is offered at $12 to $13, delivered, and the price of by-product foundry fuel is $14, delivered New England points.

Foundry Sales Active

New York, June 26.—Activity in the coke market is especially noticeable at this time in view of the dull demand for pig iron and other products. Busines in spot foundry coke continues well maintained. Prices on spot standard foundry coke range from $5.50 to $6.25, Connellsville, although anything below $5.75 is exceptional. Sales of special brands continue to be made at $6.50 and in some cases more. The Seaboard By-Products Coke Co. continues to quote $11.84 to $11.91, delivered at Newark and other northern New Jersey points.

Market Is Firm

Philadelphia, June 26.—Business in foundry coke is fair, and prices are somewhat higher. The range on 72-hour fuel is $5.50 to $7, Connellsville. The latter price applies to special brands.

Foundry Demand Improving

Cincinnati, June 26.—Sales of coke in this territory are not brisk, but inquiries for small lots are fairly numerous. Demand for foundry coke is on the upturn. That buyers are not confident of the market is indicated by the action of an Indiana user who made inquiry for last half year requirements and then closed for 5000 tons of Wise county foundry coke for third quarter. A manufacturing concern operating several plants closed for 3000 tons of Connellsville foundry coke for the last half at $7.50, ovens. Coke prices are stabilizing to a level which sellers believe will encourage buying. Most sellers expect a general buying movement beginning July 1, since users have only small supplies on hand, while many of them are assured of steady operation for the remainder of this year. Prices are unchanged, although the Eaton, Rhodes Co., has announced a reduction of $1 a ton on Ashland solvay by-product coke. The price now is $9, Connellsville base. Sales of Wise county foundry coke were made here in the past few days for prompt delivery at $7.50, ovens. A southern Ohio user is inquiring for 1000 tons of Connellsville furnace coke for prompt delivery and will pay $5 ovens. An inquiry for 500 tons of foundry coke for last half shipment has been received from a user at Knoxville, Tenn.

Market Slightly Firmer

St. Louis, June 26.—The trend of prices on Connellsville coke has been slightly firmer, with an advance of 25 cents per ton on certain brands. One sale was reported at $5.50, ovens, but the coke was high in sulphur. The prices on standard foundry coke ranges from $6 to $6.25, with offerings plentiful at $6.25. Users are purchasing more freely than heretofore, though contracting for third and fourth quarters still is below normal. A fair tonnage has been purchased by Iowa users. Local by-product producers report a brisk demand from industrial users. The largest sale reported was 4000 tons to the United States Railways Co. of St. Louis. An inquiry for 1500 tons from a Kansas utility company and one of 100 from a water gas interest are reported. Prices of by-product coke are steady, but an advance of 25 cents per ton at retail is scheduled for July 1.

Southern Output Still Heavy

Birmingham, Ala., June 25.—Coke sales are smaller than several weeks ago, though operations of by-product and beehive ovens continue at capacity. A local authority says the market apparently is in good shape, that demand is strong for all the coke manufactured, and that there has been no curtailment in output. The coal market in Alabama shows a little deflection because of the lighter demand for steam coal. Production for the week ended June 16 amounted to 359,000 tons against 361,500 for the week ended June 9, and 353,500 tons for the week ended June 2.

Pig Iron Buying Delayed

(*Concluded from Page* 1851)

a slight improvement in their trade. Capacity production is reported in all directions.

Inquiry More Active

Chicago, June 26.—A further recession of $1 a ton on Northern pig iron to $30 furnace is the outstanding event of the week in the local pig iron market. It is believed $29 furnace has been done in competitive sales. Some increased interest has been shown by melters, but most are awaiting a further decline. Some market observers predict the dip will proceed to $28 but others regard this too low. Added inquiry gives renewed activity to the market but most sales noted are for July delivery and consumers are conservative in tonnages placed. Insistence on delivery continues and suspensions are absent, due to the lack of stocks at furnaces and foundries. This indicates buying will be necessary in the near future. Some spot buying of carloads to fill immediate needs has been noted and a few sales have been closed covering full last half requirements. Southern iron is available at $25 Birmingham, although other producers are quoting $26 and a few $27. Superior charcoal iron is weaker and sales have been made under the market. During the week 100 tons was sold at $33 furnace. A decline on this grade is expected soon. Silveries is dull and it is believed a concession of $1 a ton is obtainable. Low phosphorus copper free iron is inactive and sales have been limited to small tonnages. The general tone of the market is involved, especially insofar as inquiry is involved. This indicates renewed interest on the part of melters.

Gas Company Makes Purchase

New York, June 26.—Exceptionally quiet conditions have been reflected in the pig iron market in this territory during the past week. Sales made over this period have been very small in the aggregate. New inquiries also are small, although there are quiet feelers out which may result in the purchase in the near future of several thousand tons. One transaction during the past week was the purchase by the American Car & Foundry Co. of about 500 tons of malleable iron for Berwick, Pa. The Buffalo market has settled down to $28 to $28.50 base furnace, plus 50 cents silicon differentials. The Central Pennsylvania foundry market now may be quoted at $27 to $27.50 base furnace, plus 50 cents silicon differentials. On Eastern Pennsylvania and New Jersey foundry iron, the market is unchanged at $29 base at the nearest furnace, with 2.25 to 2.75 silicon at $29.50 to $30 furnace. Virginia foundry continues to be quoted at $27.50 base furnace, plus 50 cents silicon differentials.

Tariff Board Asks for Pig Iron Cost Data

Washington, June 26.—The metals division of the United States tariff commission today sent out the questionnaires framed to uncover production cost of pig iron for the last two quarters of 1922 and the first quarter of 1923. F. M. Leonard, assistant chief of the division, will leave in a few days to assist eastern pig iron producers in filling out the questionnaires. So soon as domestic costs have been ascertained Paul F. Tyler chief of the division, Mr. Leonard and others will seek comparable data abroad. A decision in regard to asking for steel costs has not yet been made.

Ship More Locomotives

Washington, June 26.—Locomotive shipments for May totaled 238, as compared with 217 for April and 79 for May 1922, according to figures of the census bureau. During the first five months of this year a total of 1173 engines were shipped, as compared with 248 for the same period last year. Unfilled orders at the end of May totaled 2150 as compared with 2204 for the end of April and 621 for the end of May 1922.

Prices Present and Past

Representative market figures yesterday, and for last month, three months ago and one year ago

	June 27, 1923	May 1923	Mar. 1923	June 1922
PIG IRON				
Bessemer, valley, del. Pitts.	$29.27	32.07	31.67	26.96
Basic, valley	27.00	29.80	29.80	25.00
*No. 2 foundry, del. Pittsburgh	28.77	31.91	31.37	25.96
*No. 2 foundry, Chicago	31.00	32.50	31.25	23.25
Lake Superior charcoal, Chicago	36.65	36.65	35.55	30.00
Malleable, valley	27.50	30.20	29.20	24.20
Malleable, Chicago	31.00	32.40	31.25	23.25
*Southern No. 2, Birmingham	26.00	27.00	26.50	18.50
*Southern Ohio, No. 2, Ironton	28.00	31.00	30.75	23.25
Basic eastern del., eastern Pa.	28.14	30.75	29.35	25.25
**No. 2X, Virginia furnace	28.00	28.60	28.25	24.50
**No. 2X, eastern del., Phila.	30.26	32.76	32.00	27.20
Gray forge, val. del. Pittsburgh	28.27	31.17	30.77	25.96
Ferromanganese, del. Pitts.	129.79	129.79	120.79	72.82
SEMIFINISHED MATERIAL				
Sheet bars, bessemer, Pittsburgh	42.50	45.40	44.50	35.00
Sheet bars, open-hearth, Pitts.	42.50	45.40	44.50	35.00
Billets, bessemer, Pittsburgh	42.50	45.00	44.50	35.00
Billets, open-hearth, Pittsburgh	42.50	45.00	44.50	35.00
FINISHED MATERIAL				
Steel bars, Pittsburgh	2.40	2.40	2.30	1.65
Steel bars, Chicago	2.50	2.50	2.34	1.75
Steel bars, Philadelphia	2.72	2.77	2.67	2.01

	June 27, 1923	May 1923	Mar. 1923	June 1922
FINISHED MATERIAL (Continued)				
Iron bars, Philadelphia	$2.72	2.82	2.70	1.96
Iron bars, Chicago mills	2.60	2.60	2.53	1.74
Beams, Pittsburgh	2.50	2.50	2.35	1.65
Beams, Philadelphia	2.82	2.87	2.77	2.01
Beams, Chicago	2.60	2.60	2.44	1.75
Tank plates, Pittsburgh	2.50	2.50	2.35	1.65
Tank plates, Philadelphia	2.82	2.92	2.77	2.01
Tank plates, Chicago	2.60	2.60	2.44	1.75
Sheets, blk., No. 28, Pittsburgh	3.85	3.85	3.55	3.15
Sheets, blue anl., No. 10, Pitts.	3.00	3.00	2.70	2.40
Sheets, galv., No. 28, Pittsburgh	5.00	5.00	4.65	4.15
Wire nails, Pittsburgh	3.00	3.00	2.90	2.40
COKE				
Connellsville furnace, ovens	4.50	5.10	7.15	6.60
Connellsville foundry, ovens	5.50	6.10	8.15	7.20
OLD MATERIAL				
Heavy melting steel, Pittsburgh	20.00	22.20	26.10	17.40
Heavy melting steel, eastern Pa.	18.00	20.40	24.85	15.30
Heavy melting steel, Chicago	17.50	19.75	23.15	14.45
No. 1 wrought, eastern Pa.	21.50	24.40	27.60	17.50
No. 1 wrought, Chicago	16.75	19.95	23.25	14.20
Rails for rolling, Chicago	19.00	21.80	24.90	15.40

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon

Composite Market Average

Representing the Combined Average Prices per Ton of Fourteen Leading Iron and Steel Products Yesterday, One Week, One Month, Three Months, One Year and Ten Years Ago

June 27, 1923	June 20, 1923	May, 1923	March, 1923	June, 1922	June, 1913
$46.16	$46.34	$47.52	$45.31	$36.96	$26.78

Products Included Are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

Iron and Steel Prices

SCRAP PRICES, PAGE 1920, WAREHOUSE PAGE 1912, ORE NUTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 1916
Composite Market Record by Months for Nine Years on Page 1918

Pig Iron

Bessemer, valley	$28.00
Bessemer, Pittsburgh	29.19
Basic, valley	27.00
Basic, Pittsburgh	28.77
Basic, Buffalo	28.00
Basic, del., eastern Pa.	28.14 to 28.50
Malleable, valley	27.50 to 28.00
Malleable, Pittsburgh	29.27 to 29.77
Malleable, Chicago	31.00
Malleable, Buffalo	28.50 to 29.00
Malleable, del., eastern Pa.	30.00 to 31.00

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.23
No. 2 Southern foundry	1.75 to 2.25
No. 2X East'n and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 to 3.25
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern del., Phila.	31.26 to 32.13
No. 1X Buffalo	29.00
No. 2 foundry, valley	27.00 to 27.50
No. 2 foundry, Pittsburgh	28.77 to 29.27
No. 2 foundry, Buffalo	28.00 to 29.00
No. 2 foundry, Chicago	31.00
No. 2 foundry, Granite City	31.00 to 32.00
No. 2 foundry, Ironton fur.	28.00 to 29.00
No. 2 foundry, Cleveland del.	30.00 to 30.50
No. 2 foundry, del. Phila.	29.26 to 30.13
No. 2 foundry, N.J. tidewater	29.63 to 30.64
No. 2X, eastern del., Phila.	30.26 to 31.13
No. 2X, east. N. J., tidewater	30.63 to 31.64
No. 2X, eastern del. Boston	33.15 to 33.65
No. 2X foundry, Buffalo fur.	28.50 to 29.00
No. 2X, Buffalo, del. Boston	33.42 to 33.92
No. 2 southern, Birmingham	25.00 to 27.00
No. 2 southern, Cincinnati	29.05 to 31.05
No. 2 southern, Chicago	31.01 to 33.01
No. 2 southern, Philadelphia	31.80 to 33.80
No. 2 southern, Cleveland	31.01 to 33.01
No. 2 southern, Boston (rail and water)	31.91 to 33.91
No. 2 southern, St. Louis	30.17 to 32.17
No. 2X, Virginia furnace	28.00
No. 2X, Virginia, Phila.	33.27
No. 2X, Virginia, Jersey City	33.54
No. 2X, Virginia, Boston	33.92
Gray forge, eastern Pa.	28.00 to 29.00
Gray forge, val., del. Pitts.	28.27 to 28.77
Low phos., standard, valley	35.00
Low phos., standard, Phila.	34.79 to 35.79
Low phos., Lebanon furnace	33.00
Charcoal, Birmingham	34.00 to 35.00
Charcoal, Superior, Chicago	36.65

Silvery Iron

Jackson County, Ohio, furnace

8 to 9 per cent	$38.50
9 to 10 per cent	40.50
10 to 11 per cent	42.50
11 to 12 per cent	45.50
12 per cent	47.50
13 per cent	50.00

Bessemer Ferrosilicon

Jackson County, Ohio, furnace

10 to 11 per cent	$47.50
11 to 12 per cent	50.80

Ferroalloys

Ferromanganese 78 to 82 per cent, domestic, seaboard or furnace	$120.00 to 125.00
Ferromanganese, delivered, Pittsburgh	124.79 to 129.79
†Ferromanganese, 79 per cent English c.i.f. seaboard	120.00 to 125.00
Spiegeleisen 19 to 21 per cent furnace or tidewater	45.00 to 47.50
Ferrosilicon, 50 per cent contract freight allowed	87.50 to 92.50
Ferrotungsten standard, per pound contained	95.00
Ferrochrome, 60 to 70 chromium, 4 to 6 carbon per pound contained, delivered	12.00
Imported ferrochrome, 4 to 6 per cent carbon	nominal
†Duty paid.	
Ferrovanadium, 30 to 40 per cent per pound estimated, according to analysis	$3.50 to $4.00
Ferro carbon-titanium, carloads, producer's plant, per net ton	$200.00

Coke

Beehive, Ovens

Connellsville furnace	$4.50 to 5.50
Connellsville foundry	5.50 to 6.50
New River furnace	9.50 to 10.00
New River foundry	12.50 to 13.00
Wise county furnace	6.25 to 6.75
Wise county foundry	7.50 to 8.00
Alabama furnace	7.50 to 8.00
Alabama foundry	8.00 to 8.50

By-Product

Foundry, Newark, N. J., del.	$11.84 to 11.91
Foundry, Chicago, ovens	15.00
Foundry, Boston, delivered	14.00
Foundry, Granite City, Ill.	14.00
Foundry, Alabama	8.00 to 8.50

Semifinished Material

BILLETS AND BLOOMS

4 x 4-inch base

Open-hearth, Pittsburgh	$42.50
Open-hearth, Youngstown	42.50
Open-hearth, Philadelphia	44.00 to 45.00
Bessemer, Pittsburgh	42.50
Bessemer, Youngstown	42.50
Forging, Pittsburgh	47.50 to 52.50
Forging, Philadelphia	54.00 to 56.00

SHEET BARS

Open-hearth, Pittsburgh	$42.50
Open-hearth, Youngstown	42.50
Bessemer, Pittsburgh	42.50
Bessemer, Youngstown	42.50

SLABS

Pittsburgh	$42.50
Youngstown	42.50

WIRE RODS

¼-inch and finer

Wire rods, Pittsburgh	$51.00 to 52.50

SKELP

Grooved skelp, Pittsburgh	2.45c
Universal skelp, Pittsburgh	2.45c
Sheared skelp, Pittsburgh	2.45c

Shapes, Plates and Bars

Structural shapes, Pittsburgh	2.50c to 2.60c
Structural shapes, Phila.	2.82c
Structural shapes, New York	2.84c
Structural shapes, Chicago	2.60c to 2.70c
Tank plates, Pittsburgh	2.50c to 2.60c
Tank plates, Philadelphia	2.82c to 2.92c
Tank plates, New York	2.84c to 2.94c
Tank plates, Chicago	2.60c to 2.80c
Bars, soft steel, Pittsburgh	2.40c to 2.50c
Bars, soft steel, Philadelphia	2.72c to 2.82c
Bars, soft steel, New York	2.74c to 2.84c
Bars, soft steel, Chicago	2.50c to 2.60c
Bars, refined iron, Pittsburgh	3.25c to 5.00c
Bars, rail steel, Chicago	2.30c
Reinforcing bars, Pittsburgh	2.30c to 2.40c
Bar iron, common, Phila.	2.72c to 2.82c
Bar iron, common, New York	2.74c to 2.84c
Bar iron, common, Chicago	2.50c to 2.60c
Bars, forging quality, Pitts.	2.65c

Hoops, Bands, Shafting

Hoops, Pittsburgh, large	3.15c to 3.30c
Hoops, Pittsburgh, small	3.50c
Bands, Pittsburgh	3.15c to 3.30c
Cold finished steel bars, Pittsburgh base	3.25c
Steel shafting, Pittsburgh	3.25c
Cotton ties, bundle 45 lb. Pittsburgh	$1.61

Rails, Track Material

Standard bessemer rails, mill	$43.00
Standard open-hearth rails, mill	43.00
Relaying rails, St. Louis	30.00 to 39.00
Relaying rails, Pittsburgh	30.00 to 34.00
Light rails, 25 to 45, mill	2.25c
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	3.15c
Spikes, small railroad, Pitts.	3.75c
Spikes, boat and barge, Pitts.	3.50c to 3.75c
Spikes, railroad, Chicago	3.25c
Track bolts, Pittsburgh	4.00c to 5.50c
Track bolts, Chicago	4.25c
Tie plates, Pittsburgh	2.60c to 2.75c
Tie plates, Chicago	2.60c

Spike, tie plate and track bolt prices for carlots.

Wire Products

To Jobbers in Carloads

Wire nails, Pittsburgh	3.00c to 3.10c
Plain wire, Pittsburgh	2.75c to 3.00c
Annealed wire, Pittsburgh	2.90c to 3.20c
Galvanized wire, No. 9 gage, Pittsburgh	3.35c to 3.60c
Barbed wire, painted, Pitts.	3.45c to 3.70c
Barber wire, galv., Pittsburgh	3.80c to 4.05c
Polished staples, Pittsburgh	3.45c to 3.65c
Galvanized staples, Pittsburgh	3.80c to 4.05c
Coated nails, count keg, Pitts.	2.70c to 2.75c
Woven wire fencing (retailers)	.65 off
Woven wire fencing (jobbers)	67½ off

Chain, Piling, Strip Steel

Chain, 1-in. proof coil, Pitts.	6.50c
Sheet piling base, Pittsburgh	2.55c
Hot rolled strip steel, Pittsburgh stamping quality	3.30c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100-inch and heavier, 0.100-inch and heavier, base	5.25c

Sheets

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	3.75c to 3.85c
No. 28, bessemer, Pitts.	3.75c to 3.85c
No. 28, open-hearth, Phila.	4.07c to 4.17c
No. 28, open-hearth, Chicago	4.19c

TIN MILL, BLACK

No. 28, open-hearth, Pitts.	3.85c
No. 28, open-hearth, Chicago	3.84c to 4.34c

GALVANIZED

No. 28, open-hearth, Pitts.	5.00c
No. 28 bessemer, Pittsburgh	5.00c
No. 28, open-hearth, Phila.	5.32c
No. 28, open-hearth, Chicago	5.34c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	3.00c to 3.25c
No. 10, bessemer, Pittsburgh	3.00c to 3.25c
No. 10, open-hearth, Phila.	3.32c to 3.57c
No. 10, open-hearth, Chicago	3.34c

AUTOMOBILE SHEETS

No. 22 Pittsburgh	5.35c to 5.70c

Tin Plate

Per 100 lb. box

Tin plate, coke base, Pitts.	$5.50 to $6.00

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers in Carloads

	Black	Galv.
1 to 3-inch, butt steel	61 to 62	49½ to 50½
1 to 1½-inch, butt iron	30	13

Boiler Tubes

Less Carload Discounts—Carloads 4 Points Additional

Steel 3¼ to 3¾-inch	38½
Charcoal iron, 3¼ to 4½-inch	5
Seamless hot rolled, 3½ to 3¾-inch	35

Cast Iron Water Pipe

Class B Pipe

Four-inch, Chicago	61.20 to 63.20
Six-inch and over, Chicago	57.20 to 59.20
Four-inch, Birmingham	53.00 to 54.00
Six-inch and over, Birmingham	49.00 to 50.00
Four-inch, New York	63.60 to 65.50
Six-inch and over, New York	59.00 to 60.00
Three-inch, Birmingham	59.00 to 60.00

Class A pipe is $5 higher than Class B.

Standard fittings, Birmingham, base, $110.00 6 to 24-inch, base; over 24-inch, plus $20; 4 inch, plus $20; 3 inch, plus $20; gas pipe fittings, $5 higher.

Scrap Prices Still Weak

Quotations Continue To Decline—Consumer Buying Limited to Small Tonnages—Statistical Position of Market Strong

SCRAP PRICES, PAGE 1920

Chicago, June 26.—A better feeling is apparent in the iron and steel scrap market. Dealers are able to handle shipments of mixed railroad and country scrap which a short time ago went begging because of difficulty of sorting it under existing labor conditions. This situation has changed somewhat and yards are in a position to care for these grades. Sales by railroads are bringing much better prices than a short time ago and other indications are seen that the bottom of the present decline probably has been reached. There is better buying and users of steel grades are willing to take on further tonnage. Rolling mills are taking moderate quantities and foundries continue out of the market. The Chicago, Burlington & Quincy offers 6300 tons and the Big Four has issued an open list.

Prices Still Decline

Boston, June 26.—The New England scrap iron and steel market now is on a $14 basis for heavy melting steel. This price has been established through several heavy orders placed with eastern Pennsylvania mills at about $18.50 delivered. West Virginia mills have been in the market for low grade steel scrap for which they have offered $19.50 which with the heavier freight rate means about $13.50 at dealers' yards. This price as yet local interests have refused to meet. Local consumers have been buying borings and turnings at $11. Other cast grades continue exceedingly dull with prices irregular. No. 1 cast has sold at $22 per gross ton delivered, and a good grade of textile scrap has sold at $22.40. Other sales of this latter grade have, however, been reported quoted as high as $24 delivered.

Price Weakness Still Prevails

New York, June 26.—With prices the lowest they have been in more than six months, the local scrap market again is off on several grades about 50 cents a ton. No. 1 heavy melting steel is holding at $14 to $14.50 New York; No. 1 railroad steel, $14.50 to $15; and city wrought $17 and $18; clean cast borings, iron car axles, machine shop turnings and mixed borings and turnings, are among the other grades on which prices recently declined. Hand-to-mouth buying, with some dealers eager for business, is the situation contributing chiefly to the continued weakness. The Bethlehem Steel Corp. has been a fair buyer of No. 1 railroad steel, paying $17.50 delivered, 50 cents under what it was offering a week ago, and has also been closing on No. 1 heavy melting steel at concessions. The Pittsburgh market is showing little interest in this district, current shipments being principally on old orders.

Sales Volume Shrinking

Philadelphia, June 26.—Scrap iron and steel demand continues to shrink. Sales during the past week were small, the largest buyer being the Bethlehem Steel Corp. which took a fair sized tonnage of heavy melting steel. A considerable portion of current business involves forced sales. Several grades are quoted lower and the feeling among dealers is pessimistic. A price of $16.50 for heavy melting steel is predicted in some quarters. Nevertheless, the statistical position of the market does not appear unfavorable. There is much less stock in dealers' yards than normally and consumers are carrying less stocks than usual.

Sales Are Small

Pittsburgh, June 26.—Indicative of slack conditions prevailing here in the scrap iron and steel market, a Midland, Pa., consumer late last week closed on 2000 tons of heavy melting steel at $20.75. Dealers today are paying $20 to $20.50, making that the quotable market. Monessen, Pa., continues embargoed and consumers in other directions have not yet released tonnages on order. A few small lot sales of hydraulic compressed sheets have been noted around $18.50, but heavy breakable cast, cupola cast and cast iron borings are a drug on the market. Consumers will not pay $22.50 for steel car wheels, and other steel specialties show further weakness. Several other grades are marked down 50 cents to $1 per ton. Railroad lists are due soon and the July list of the Westinghouse Electric & Mfg. Co., identically the same as a month ago, is due for early closing.

Demand Continues Quiet

Buffalo, June 26.—The market for scrap iron and steel remains quiet with prices nominal. Some interest is being made by two large consumers and dealers believe they will be forced into the market through shortage of stocks. These users have been out of the market six weeks and have been consuming heavily. Turnings are off $1 and borings $2.

Price Decline Continues

Detroit, June 26.—Scrap prices continue to decline owing to liberal offerings from producers and lack of consumer inquiry. Consumers are taking a fair amount but mainly on old contracts. Inquiry for turnings and automobile cast continues fair. Inquiry from mills indicates new buying will not begin for more than 45 days hence as consumers are reported well supplied. In some instances producers are disinclined to part with stocks at present price levels and among large producers much is being held. Yard men report supplies large. Hydraulic compressed sheets are particularly weak with prices unstable, showing a reduction of $1 a ton from a week ago.

New Buying Limited

Cleveland, June 26.—Inactivity continues in the Cleveland iron and steel scrap market. No new buying is in evidence although contract tonnage is going forward rather freely, few hold-

(Concluded on Page 1869)

Quiet Market

Still Prevails On Various Ferroalloys—Some Holdups on Spiegeleisen

FERROALLOY PRICES, PAGE 1853

New York, June 26.—Little ferromanganese has changed hands during the past week, in fact, demand is dull. Consumers report, however, that consumption continues heavy and there is no abatement of interest in getting deliveries on contracts previously placed. The market as to prices is unchanged. First hands including both importers and domestic producers, continue to quote $125 tidewater or furnace, which includes the duty. Some resale metal continues obtainable at $120.

Occasional lots of spiegeleisen are being sold but outside of contract deliveries the market is quiet. The $50 price on spot spiegeleisen has disappeared and the market now may be quoted at $45 to $47.50 furnace for 20 per cent metal for any delivery.

Price of 50 per cent ferrosilicon has eased somewhat further, with business done at less than $90 delivered in some cases. The market may be quoted $87.50 to $92.50, delivered. The price of 75 per cent ferrosilicon is about $150, delivered. Owing to lower continental exchange rates and competition between importers, price of the low-carbon grades of ferrochrome have been marked down sharply on some transactions. Domestic producers prices are unchanged. The tungsten market is unchanged, with Chinese wolframite quoted $8.25 to $8.50; scheelite, $8.75 to $9 a short ton unit; ferrotungsten 95c a pound contained; tungsten powder, $1 a pound. Ferrovanadium business is well maintained at $3.50 a pound base for the open-hearth grade at $3.75 to $4 a pound for the tool steel grade.

Buyers Interest Is Limited

Pittsburgh, June 26.—Only a limited interest is shown in the ferroalloys market, either as to obtaining prices or as to placing orders. Purchases for the first half were heavy and consumption has not utilized the stocks then accumulated; hence, material is on hand for use in the third quarter in many directions. Ferromanganese is quoted at $125, seaboard base, for all delivery positions, whether prompt or forward. One or two inquiries are out for 50 to 100 tons each. On less carloads, $140 seaboard base, is minimum.

A few inquiries are out for 50 to 100 tons each of spiegeleisen, larger buyers continuing to defer action on last quarter. From $45 to $47.50 furnace, continues to be quoted by one leading producer on 19 to 21 per cent and $44 to $46.50 furnace, on 16 to 19 per cent. Another producer expecting to make this material soon is quoting $50 furnace, on small quantities with $45 possible on larger amounts of 18 to 22 per cent. Its furnace is nearer to Pittsburgh and it therefore has freight advantage. Some users of spiegeleisen have considerable material on hand and are holding up shipments scheduled for this month.

From $90 to $92.50 is quoted on 50 per cent ferrosilicon. The Pressed Steel Car Co. wants 50 tons. Some foreign ferrochrome is being offered at 11½ cents, Baltimore, for the grade on which domestic producers are quoting 12 cents. No inquiries now are current in this vicinity for either ferrochrome or ferrovanadium, but some of the crucible steel people will buy ferrotungsten and are offering to pay 90 cents. Some purchases recently were consummated at 92½ cents but the majority of quotations are above that, at 95 cents minimum. For the powder, $1 and higher are the usual prices quoted. A scarcity of prime ferrotungsten as well as the tungsten powder is noted.

Resale Still Is Offered

Philadelphia, June 26.—Ferromanganese from first hands remains firm at $125 duty paid tidewater or furnace. Practically no sales were made the past week. Resale metal continues obtainable at $120.

Tin Plate Users

Are Seeking Increased Deliveries On Contracts—Production Heavy

TIN PLATE PRICES, PAGE 1853

Pittsburgh, June 26.—Users of tin plate are seeking increased deliveries on their contracts. Apparently they fear that under curtailment of operations brought about by labor shortages they will not receive their full complement of material. Notwithstanding various handicaps, however, records no doubt will have been broken when the final compilations for the first half are made in July. For instance the American Sheet & Tin Plate Co. states shipments for the first half have exceeded by 2 or 3 per cent any corresponding period in its history. While one or two of the handicaps lately have been removed, the limited supply remains the chief deterrent. This past week hot mill operation has been curtailed in the neighborhood of 10 per cent due to high temperatures causing deflection of workmen. Present obligations cannot possibly be discharged in the third quarter and already tonnages are offered for shipment in the fourth. These will be entered later after the books have been opened for the fourth quarter. The price is unchanged at $5.50 to $6, the general market price being $5.50 per base box of 100 pounds, Pittsburgh.

Prices Are Stronger

Philadelphia, June 26.—Stock tin plate prices are stronger now, it being difficult to buy under $5.75 per base box Pittsburgh. Some business has been done at $6 per base box.

Japan Again in Market

New York, June 26.—The Nippon Oil Co., which recently placed more than 30,000 boxes of tin plate with the Bethlehem Steel Export Co., now is in the market for an additional 37,500 boxes.

The unsubscribed portion of the 100,000 $10 par value Truscon Steel Co., Youngstown, O., has been offered by The Union Co., of Detroit and H. W. Noble & Co., also of Detroit, at $20 per share.

More Sheet Bars Offered

Price of $42.50 Now General—Recent Buying by Steel Corporation Totals 25,000 Tons—New Business Moderate

SEMIFINISHED STEEL PRICES, PAGE 1853

Pittsburgh, June 26.—It now develops that the large purchaser of sheet bars three weeks ago previously referred to in IRON TRADE REVIEW was the American Sheet & Tin Plate Co., one lot involving 20,000 tons through a middle interest and another 5000 tons from a second source of supply, all open-hearth bars. These lots are understood to have been closed at $43.50 to $44.50 delivered. Other purchasers more recently have covered for their third quarter requirements at $42.50 Pittsburgh and Youngstown and while reports of concessions under that have been circulated, they are not confirmed; hence, the market stands unchanged at that figure. Numerous offers of tonnage now are appearing due to the fact that so much steel will be produced while rolling departments will be idle for a week or two in July. One local independent steel company has been particularly anxious for tonnage and its price is understood to be open to negotiation.

The $42.50, Pittsburgh or Youngstown, figure now applies to billets and slabs as well as sheet bars. One maker of forging billets is quoting $47.50, Pittsburgh, for deliveries at mills' convenience but will give no indication of when that will be. The general market is quoted at $50 to $52.50, Pittsburgh. Demand is limited. Wire rods, for the No. 5 to ¼-inch, are quoted at $51 to $52.50, base Pittsburgh, some independents having joined the American Steel & Wire Co. in quoting the minimum figure on a lot of 500 tons recently up for negotiation. The standard extras continue to apply, namely $2.50 for larger than ¼-inch; $5 for screw stock; $15 for acid wire rods. The carbon extras are unchanged; $3 for 0.20 to 0.40 carbon; $5 for 0.41 to 0.55 carbon; $7.50 for 0.56 to 0.75, and $10 for carbon over 0.75.

Skelp, universal, grooved or sheared, still is quotable at 2.45c, base Pittsburgh. New demand is limited and deliveries are coming to the skelp users in amounts exceeding their absorptive capacity due to depleted labor forces.

3000 Tons of Rods Sold

Boston, June 26.—The sale of 3000 tons of wire rods in this district during the past week is noted.

Sell on Delivered Basis

Philadelphia, June 26.—Billet sales comprise only moderate lots. Total sales in the past week probably did not exceed 750 tons. Most prices on eastern sales now are quoted on a delivered basis. Rerolling billets are bringing $44 to $45, delivered, Philadelphia. Forging billets are $54 to $56, delivered, Philadelphia. Moderate sales of wire rods are reported at $51, base Pittsburgh.

The New York Central railroad is inquiring for 250 tons of billets upon which bids will be taken July 2.

Covered For Third Quarter

Youngstown, O., June 26.—Consumers of semifinished steel in this district are covered for the third quarter and practically no inquiries are in the market. Sheet bars are offered at $42.50, Youngstown, but no sales are reported. While the suspension of sheet mills next week will make available a round tonnage of sheet bars this excess supply will not be as large as contemplated a week ago in view of complete suspension of semifinishing mills of one large producer. One large consumer of sheet bars has closed on 25,000 tons at $43.50, delivered, with mills outside this territory.

Price of $42.50

Cleveland, June 26.—Sufficient number of sales of sheet bars have been made to establish $42.50 as the general asking price for third quarter delivery, and this also is the price now applying on current shipments. The same price applies to billets and slabs. The leading maker in this district has not taken on any additional tonnage, and the market is quiet.

Producers of wire rods now are taking a limited amount of new business for third quarter at $51, base Pittsburgh. Several lots have been closed in the district. The $51 price now is generally quoted by independents.

Warehouse Orders Still in Fair Volume

WAREHOUSE PRICES, PAGE 1912

Philadelphia, June 25.—Demand for iron and steel out of warehouse is slightly less than in recent weeks, but the total continues large. Prices locally are unchanged but jobbers continue to grant some concessions to meet New York and Baltimore competition.

Trading Is Brisk

New York, June 26.—Trading in the local warehouse market continues brisk, with demand for reinforcing bars outstanding. However, it appears certain business in June will not be as good as in May. Prices, with the exception of those on galvanized sheets, are showing no weakness.

Demand Is Unchanged

Cleveland, June 26.—The demand for iron and steel products out of stock is practically unchanged from a week ago. Jobbers report the volume of business continues heavy, and orders involve some fair sized tonnages. Prices are unchanged from last week.

Purchases Spar Tonnage

Pittsburgh, June 26.—Some slight interest in fluorspar is beginning to be manifested; two or three inquiries for fair sized tonnages being out. Among recent purchasers is the Weirton Steel Co., Weirton, W. Va., buying a tonnage at $20 f.o.b. Kentucky mines, for the 85 and 5 per cent grade. Deliveries will extend over the fall; hence, it is estimated its winter's needs have been met from two or three sources of supply.

Book Third Quarter Bars

Western Producers Are Fully Booked for Third Quarter Output—New Inquiries Developing—Consumers Seeking Deliveries on Old Contracts

BAR PRICES, PAGE 1853

Chicago, June 26.—Producers of finished steel here are sold practically for their entire production during third quarter and in some cases have sufficient tonnage on books to run them to the end of the year. On top of this heavy order book comes an insistant demand from consumers that shipments of their steel be expedited as they have need for every pound before it gets to them in the ordinary routine.

Mills continue to operate at the same rate that has prevailed for several weeks and while some progress is being made on catching up on deliveries the situation is still far from satisfactory.

Soft steel bars continue quoted at 2.50c, Chicago mill, for indefinite delivery, while 2.60c, Chicago, is available on a limited tonnage for third quarter delivery. The present heated condition is limiting output of mills to a considerable extent. The market for soft steel bars is strong, borne up by the unsatisfied needs of steel users. This unsatisfied need results in pressure for shipments against present contracts and most consumers could use more steel than they are now receiving.

Producers of bar iron will have their mills closed through the week of July 4 and perhaps for a longer period, to allow the usual mid-summer repairs to be made and while inventory is being taken. Bookings are being made lightly, somewhat under the total of iron now being shipped. The market at present is quotable at 2.50c to 2.60c, Chicago mill.

Demand for rail steel bars is good and selling is going on continuously. Requirements of companies which use this material are such that full operation of practically all rail steel mills is assured for the remainder of the year. Some time will be lost the week of July 4 because of the holiday and because of a shutdown for repairs.

Some Buyers Show Hesitancy

Pittsburgh, June 26.—While the cold-drawn bar industry shows some hesitancy about closing on its third quarter merchant steel bar requirements, other consuming lines are going ahead. These include the spring steel industry which has issued fairly large specifications for July shipments. Users continue to take everything in on old orders however, and are pressing mills for heavier deliveries. Producers are weeks, and in some cases months behind on deliveries. Prices remain firm at 2.40c, base Pittsburgh.

Refined iron demand shows steadiness. Prices are from 3.25c for refined iron up to 4.85c to 5.00c for double refined iron.

Deliveries Still Far Extended

Cleveland, June 26.—Some new inquiries for steel bars in this territory the past week developed delivery promises from mills of four to five months. One lot which is up for negotiation called for 300 tons of steel bars and bands. While at least two makers will promise nothing under four to five months, others can ship more promptly. One maker is taking business from three to four weeks delivery and another can ship in about 60 days. The former seller has been taking such business at 2.40c, Pittsburgh, but another mill able to make about the same deliveries has been getting $2 premium. The minimum basis of the market remains 2.40c, Pittsburgh. The general volume of new business is betbetter but not in a large degree. Buyers are taking shipments freely up to the maximum of their obligations and there are no suspensions or cancellations.

Inquiry Is Improved

Buffalo, June 26.—Inquiry for steel bars is better though orders are not in the same proportion. Carload lots and up to 200 tons have been sold here during the week. The general price is 2.40c, Pittsburgh. Car companies are sold ahead solidly for the year.

Improved Demand Reported

Boston, June 26.—Two important makers report an improved demand for merchant steel bars during the past week and sales total close to 2000 tons. The price for round tonnage is 2.40c, Pittsburgh base. Small lots have been placed as high as 2.45c, Pittsburgh.

Some Fair Tonnages Placed

Philadelphia, June 26.—An active demand for steel bars during the past week has been reported by producers in this district. The business taken during the week has involved some large tonnages for third quarter and included railroad buying of fair size. The price of 2.40c, Pittsburgh or 2.72c, Philadelphia, is being firmly held.

Cold-Drawn Changes Few

Pittsburgh, June 26.—Little change is noted in the cold-drawn steel bar market from week to week and at present demand is of a more or less even tenor. No cancellations are received and suspensions are inconsequential from the automotive industry. Some buying has been done for third quarter at the 3.25c base Pittsburgh level, additional orders involving 200 to 500 tons each having been placed the past week. A labor shortage hinders full production.

Bolts, Nuts and Rivets Are in Brisk Demand

NUT AND BOLT PRICES, PAGE 1916

Pittsburgh, June 26.—Brisk demand for nuts, bolts and rivets is noted by a few of the leading manufacturers here and these only are able to offer 60-day deliveries. Others not so well fixed with order backlogs quote 10 days' to two weeks' delivery on certain sizes. One or two makers are well filled up for third quarter. No cancellations are reported and new orders for a carload or more at a time are numerous, with a fair sprinkling of larger specifications. Different consuming lines are represented among buyers.

Prices are fairly firm on the basis of 50 and 10 per cent off for large machine bolts. Competition is more keen on rivets and while the going market levels still are 3.25c and 3.35c, base Pittsburgh, on structural and boiler rivets respectively, concessions of $1 or $2 per ton under that are offered for attratcive orders. Smaller rivets are quotable at 60 and 5 off, attractive tonnages carrying a discount of 60 and 10 per cent off.

Third Quarter Well Covered

Chicago, June 26.—Most contracts for bolts and nuts for third quarter have been covered. About the usual tonnage of bolts has been involved in contracts. Prices are steady. In addition to this contract business, considerable spot buying is being done to meet users' requirements.

Order Volume Is Fair

Cleveland, June 26.—Considerable orders in bolts, nuts and rivets are being taken by producers in this territory. Prices are being firmly held on all business accepted and practically no shading is reported. All makers are not yet taking contracts for third quarter but are expected to within a few days. The leading rivet maker states it is receiving a large volume of orders for third quarter, at 3.25c and 3.35c, Pittsburgh for structural and boiler rivets respectively. Spot business is small.

Shading Prices on Current Orders

Philadelphia, June 26.—Third quarter contracts are being booked for bolts and nuts. On current business prices are being shaded 10 per cent in many cases, especially on attractive business.

Hoop Output Obligated

HOOP PRICES, PAGE 1853

Pittsburgh, June 26.—Orders for the output of hoops and bands over the third quarter are in the hands of several makers including some of the hot strip steel manufacturers. Among the latter, a few still have room for plain black material in the narrow sizes and thin gages. Demand is fairly diversified, coming from stamping and forming concerns as well as the cooperage trade. Prices are unchanged, the general market being quotable at 3.30c; preferential customers obtaining 3.15c, and small hoops carrying a 3.50c, base Pittsburgh price.

Plants Are Damaged

Pittsburgh, June 26.—Damage estimated at $150,000 was done to the plant of the Copper Clad Steel Co. and the foundry of the Acheson Mfg. Co., Rankin, Pa., June 24, when both plants were struck by lightning. Laborers in the Copper Clad Steel plant formed a bucket brigade but the fire got beyond their control. The plants of the Consolidated Woven Wire Co. and the Central Expanded Metal Co. were endangered. Fred Robertshaw, general manager of the Acheson company, estimated damage to its plant at $75,000. Valuable patterns and molds were destroyed. The foundry, a building 100 x 150 feet, was burned

to the ground. Jacob Roth, president of the Copper Clad Steel Co., stated the wire mill of its plant had been destroyed at a loss of $75,000. The building is 150 x 250 feet.

Hot Weather Interfering With Valley Operations

Youngstown, O., June 26.—Torrid weather is interfering with finishing mill operations throughout the valley and not more than 75 per cent of maximum production is being obtained. Practically all sheet mills are able to get under way at the start of the week, but at some plants the day turn frequently ends with not more than 15 per cent of hot mills engaged. As a result there is a large loss of sheet tonnage and shipments are being extended.

Sheet mill operation receded from 98 to 92 per cent owing to the shut-down of the Falcon Steel Co.'s mills for repairs. Next week all sheet mills in this district will suspend operations, according to latest advice as is customary at this time.

At the start of this week 107 hot sheet mills were under power including 42 at the Youngstown Sheet & Tube Co., 17 each at the Republic Iron & Steel Co. and the Newton Steel Co., 15 at the Trumbull Steel Co., 9 at the Sharon Steep Hoop Co., and 7 at the Mahoning Valley Steel Co.

Steelwork operation is unchanged at 96 per cent although plans call for the suspension of the entire open-hearth department at one plant next week. This week's schedule includes 22 active open hearths at the two plants of the Youngstown Sheet & Tube Co., 14 at the Republic Iron & Steel Co., 7 at the Trumbull Steel Co., and 6 at the Sharon Steel Hoop Co.

Other activity includes 11 pipe, 2 bar and 3 plate mills and the rod, wire and bessemer departments at the Youngstown Sheet & Tube Co.; 8 finishing and 5 pipe mills and the bessemer department at the Republic Iron & Steel Co.; and about 25 hot tin mills and the strip departments at the Trumbull Steel Co.

Plans Action for Cut in Coal Rates

Washington, June 26.—It is understood the Pittsburgh Coal Co., Pittsburgh, is planning to file a complaint with the interstate commerce commission asking for a reduction on freight rates on coal from the Pittsburgh district to Lake Erie ports for transhipment to the upper lake ports. Such action necessarily would involve a comparison of the cost of moving coal to the lake front and of ore from the lake front to interior furnaces.

The commission still has before it the complaint of Buffalo furnaces asking for either an increase in exlake ore, or a reduction on coal to Buffalo.

A special meeting of the stockholders of the Landers, Frary & Clark Mfg. Co., New Britain, Conn., has been called for July 11 to act on increasing the capital stock from $7,000,000 to $10,500,000 which will mean a 50 per cent stock dividend.

Plate Tonnage Is Larger

New Bookings in East Equal in Volume to Current Shipments—Railroads More Active in Placing Orders

PLATE PRICES, PAGE 1853

Chicago, June 26.—An inquiry for 2,000 tons of plates for oil storage tanks has been covered recently by an independent platemaker in this market. The destination of these plates is not known. A Chicago fabricator is now figuring on 2000 tons of plates for tank work with a Chicago producer and it seems probable it will be filled. It is understood the 24,000 tons of plates required for a penstock and pipe line for the Hetch Hetchy project at San Francisco has been placed with the Bethlehem Steel Corp. and the United States Steel Corp. Bids still are being considered on steel for 10 government barges for use on the Mississippi river, which will require 1100 tons. Plates continue to be quoted at 2.60c, Chicago, for indefinite delivery while such third quarter plates as can be sold now by an independent mill are quoted at 2.80c, Chicago.

The United States Engineer's office, Louisville, will receive sealed bids to July 16 for furnishing and delivering six steel pump scows.

Plate Orders Larger

Philadelphia, June 26.—Plate demand has been improving to a surprising extent. Eastern mills have been booking new orders sufficient to replace shipments. One eastern maker in the week before last booked more than it shipped despite the fact its shipments were at a record rate. The largest buyer is the Pennsylvania railroad which took at least 5000 tons for third quarter, and probably a good deal more. This was additional to third quarter tonnage which the railroad recently placed. Hot weather is interfering with operations to some extent. One mill closed down last Thursday for a day. One eastern mill will close down July 4 for the remainder of the week. Most mills will shut down only on July 4, while one mill will run right through. New inquiries include one for 2400 tons, or twice that tonnage, for one or two new boats. Considerable skelp tonnage for an oil line has been booked by an eastern mill. The usual price on attractive tonnage of plates continues at 2.50c, Pittsburgh, equivalent to 2.82c, Philadelphia, although considerable tonnage continues to be booked at 2.60c, Pittsburgh.

Tonnage in Better Volume

Cleveland, June 26.—The volume of new business in plates makes a better showing and some fair sized tonnages are included in this. The Big Four railroad took bids today on practically 1500 tons of plates as well as some lots of bars and structural shapes for its third quarter shop requirements. This lot includes about 1250 tons of tank steel and the remainder boiler and firebox. Another inquiry calls for 600 tons for small oil tanks and a lot of 400 tons for a similar purpose is under negotiation. While shipments from the mills are coming along better, deliveries on new business have not changed perceptibly. One buyer seeking a tonnage this week was quoted nothing under four months by a large producer. The larger mills usually state their deliveries as two to five months. Premium mills particularly those in the east can ship in two to five weeks, depending upon whether the order is for universal or sheared plates. These producers are booking more tonnage than several weeks ago. Their prices range from 2.60c to 2.70c, mill or Pittsburgh, depending upon direction of shipment. One lot of about 150 tons for quick delivery was closed in this district at 2.70c, mill, the past week. Local mills are quoting 2.60c, Pittsburgh. The market remains generally firm at a minimum of 2.50c, Pittsburgh.

Business in Fair Total

New York, June 26.—Current demand for plates here is made up of small and moderate size tonnages. These constitute a fair total, although this is not nearly equal to the present rate of mill shipments. With the eastern mills which a few weeks ago were obtaining premiums for early shipments, the usual price on attractive lots now is 2.50c, base Pittsburgh, equivalent to 2.84c, delivered New York. This is the same figure which the large makers have been asking right along for shipment at mill's convenience.

The New York Central railroad will take bids on July 2 on up to 5000 tons of plates, shapes and bars, representing its third quarter requirements.

Large Lists Are Rare

Pittsburgh, June 26.—Large plate tonnages are rare at present, the majority of inquiries calling for small lots, 50 to 200 tons at a time. A few inquiries are out for 1000 to 2000 tons. A few tanks still are wanted for the Oklahoma-Texas oil field installation, but these are miscellaneous requqirements, no large lot being up for consideration according to local fabricators. Plates remain firm at 2.50c. Reports to the effect that 2.40c, base Pittsburgh, is obtainable are not being substantiated. Boiler and barge inquiries come up occasionally and these involve limited tonnages. The Dravo Contracting Co. is low bidder on two oil barges for the United States engineers in the Cincinnati, O. district. These probably will involve 600 tons. Pressure is being brought to bear upon the mills for deliveries of material, and upon fabricators for fabricated plates. The latter now are three to six months behind.

Retires from Service

Perry E. Carhart, inspecting engineer for the Illinois Steel Co., Chicago, on July 1 will retire from the services of the company due to ill health. In appreciation of his long service, since 1889, he has been appointed consulting inspecting engineer of the company, without duties assigned for the present.

Building Bar Demand Good

Awards and Inquiries for Concrete Reinforcing Bars Continue Light —Heavier Tonnages in Prospect—Price Weakens in Some Districts

REINFORCING BAR PRICES, PAGE 1853

Cleveland, June 26.—Some shading of prices was experienced in the local concrete reinforcing bar market during the past two weeks. On new steel, 2.40c base Pittsburgh, is holding strong, but on rerolled material considerable variation has developed due mainly to the competitions of mills which recently have come into the market. On carload lots 2.35c mill or Pittsburgh now is openly made while on close competition this price has been cut $1 and $2 per ton. On goods out of stock there is being some shading done, prices on small lots going at 3.36c, Cleveland, or 3.15c, base Pittsburgh. Lettings were confined to projects requiring from 10 to 25 tons, with few of these being closed. The demand slumped back to a dullness characteristic of the market several week previous. Two jobs using rerolled bars went to the Massillon Reinforcing Bar Co., Massillon, O. One of them was for the medical clinic building, Cleveland, taking 150 tons, and the other, requiring 60 tons of bars, was for the Euclid-Fourteenth building, Cleveland.

Demand Good for Small Lots

Buffalo, June 26.—Concrete bar makers report demand unceasing for small tonnages, but nothing large is now in the market. Plenty of business is being offered for lots under 100 tons. The price is 2.85c, base Pittsburgh.

Fair Tonnages Are Awarded

Pittsburgh, June 26.—Fair sized tonnages of reinforcing concrete bars have been awarded in this section during the past week. Those for the building for the Conroy-Prugh Co., Pittsburgh, to be erected by the Inland Construction Co., were awarded to the Truscon Steel Co. The Concrete Steel Co. was reported to be successful in receiving the award of 260 tons for road work at Universal, Pa., from Booth & Flinn, Ltd., Pittsburgh. Other small awards are noted involving carload and less-than-car-load quantities. Several fair sized inquiries are up for bids, including the Bessemer & Lake Erie dock at Conneaut, O., 740 tons; building for the Dubois, Pa. water works, 200 tons; addition to Bedford Springs, Pa., hotel, 100 tons; school house, Boggs avenue, Pittsburgh, 100 tons, and a large carload each for a boiler house for the Pittsburgh Plate Glass Co., Pittsburgh, and the Troutman Department Store, Greensburg, Pa. From 2.55c to 2.75c, base Pittsburgh, is quoted on concrete bars from stock, but the mill price is unchanged at 2.40c, base Pittsburgh. Rerolled bars however are down to 2.35c mill and lower has been done in close competition.

Better Demand In West

Chicago, June 26.—Buying of reinforcing bars is keeping up well in Chicago and the West. Information from the East is that the situation is strengthening there and that more bars are being bought. The entire market has a better tone and conditions are strong, with the quotation remaining at 3.15c, Chicago warehouse, and no shading being met.

CONCRETE CONTRACTS PLACED

Awards this week	1,745 tons
Awards last week	7,655 tons
Awards two weeks ago	5,355 tons

500 tons, reclamation service, Yakima storage project, Seattle, to Pacific Coast Steel Co.
260 tons, road work at Universal, Pa., reported placed with the Concrete Steel Co.
200 tons, Fisk street machine shop of Commonwealth Edison Co., Chicago, to Corrugated Bar Co.
150 tons, medical clinic building, Euclid avenue and Ninety-third street, Cleveland, to the Massillon Reinforced Bar Co.
125 tons, highway work in Kentucky, to the Kalman Steel Co.
110 tons, highway work in Illinois, to Concrete Steel Co.
100 tons, building for the Conroy-Prugh Co., Pittsburgh, to the Truscon Steel Co.
100 tons, high school at Kankakee, Ill., to Olney J. Dean.
100 tons, highway work in Minnesota, to the Kalman Steel Co.
100 tons, highway work in Illinois, to the Kalman Steel Co.

CONCRETE CONTRACTS PENDING

1000 tons, Cotton Exchange building, Memphis, Tenn.; readvertised for bids.
275 tons, garage for P. C. Winn, Chicago; bids in.
200 tons, building for the waterworks, Dubois, Pa.; bids being taken.
175 tons, building No. 6, Underwriters' Laboratories, Chicago; general contract to H. F. Friestedt Co., Chicago.
135 tons, viaduct over Illinois Central tracks at Twenty-third street, Chicago; bids in.
100 tons, addition to hotel, Bedford Springs, Pa.; bids being taken.
100 tons, Boggs avenue school, Pittsburgh; bids being taken.

Wire Books

For Third Quarter Are Practically Filled—Prices Are Firm

WIRE PRICES, PAGE 1853

Pittsburgh, June 26.—With wire mills filled with orders on bright wire covering all they can produce during the third quarter, with room left for only an extremely limited tonnage of nails, and with reservations made for barbed wire, staples, fencing, etc., only a few places are left open on mill books for tonnage to be shipped prior to Oct. 1. Under these conditions prices are firm; in fact, since costs of production show no decline little margin is said to be left under present bases. Demand is well scattered and great pressure is brought to bear for deliveries. The usual market price on plain wire is 2.75c, while on wire nails it is 3.00c, base Pittsburgh.

Railroad Wants Tonnage

New York, June 26.—The New York Central railroad is issuing an inquiry for 500 tons of wire nails and staples upon which bids will be taken July 2. This material is for the third quarter requirements of this railroad.

Demand Is Improved

Boston, June 26.—A slightly improving wire and wire products market in New England is reported. Most interests report better inquiry and warehouses are commencing stocking up. The leading interest is quoting 2.75c, Pittsburgh, on plain wire, and prices range from this to 3.00c, Pittsburgh.

Will Buy Cables

Philadelphia, June 26.—The Delaware river joint bridge commission shortly will advertise for bids for cables for the Delaware river bridge connecting Camden, N. J., and Philadelphia. The project involves 7000 tons of wire cable and 1700 tons of steel for anchorages.

Inquiry Is Heavy

Buffalo, June 26.—Inquiry for nails and commercial wire is heavy. Mills are working at top speed but cannot take care of the demand.

Wire Makers Sell Sparingly

Chicago, June 26.—With production of wire and nails behind delivery schedules, makers are selling with caution. No new accounts are being taken and sales to regular customers are held to the lowest point. Deliveries on ordinary nails average about 10 weeks, while coated nails are sold for four months into the future. Production is about 80 per cent of capacity. Prices are unchanged.

Pipe Consumers

Press Makers for Heavier Shipments 83-Mile Inquiry Is Issued

PIPE PRICES, PAGE 1853 AND 1916

Pittsburgh, June 26.—In an effort to obtain increased shipments jobbers and users of standard full weight merchant pipe are pressing producers in various other ways. This has particular reference to jobbers and is not confined to any one section. Orders taken recently have involved many single carloads with larger quantities specified from time to time, and all are on the basis of the April 19 cards. Pipe jobbers seem unable to accumulate satisfactory stocks to meet current demands. Some let-up in drilling activity is anticipated by oil well operators, with a consequently lessened demand for oil country pipe, etc. Pressure for shipments on old orders however, still continues.

Dealers Seeking Deliveries

Buffalo, June 26.—Distributors are straining every effort to receive from mills material to keep pace with the demand for pipe. Stocks are low and selling is from hand to mouth. A movement is on in lap-welded with strong demand for 4, 5, 6 and 7-inch sizes.

New Cast Demand Light

New York, June 26.—With the exception of several hundred tons for Yonkers, N. Y., on which bids close tomorrow, little new demand is current for cast iron pipe. Sellers assert, however, that no weakness is in evidence, and in support of that statement point to the sold up condition of practically all shops in this district, October being generally offered.

The New York Central railroad will take bids July 2 on 20,000 seamless steel boiler tubes which will cover

its third quarter requirements of pipe.

The general contract for the 200 tons of cast iron pipe required for the approaches on the New York side to the New York-New Jersey vehicular tunnel was awarded this week to Rodgers & Hagerty Inc.

83 Miles Are Wanted

Cleveland, June 26.—An inquiry has been issued in this district for 35 miles of 6-inch and 48 miles of 4-inch line pipe for an unnamed oil and gas interest. This inquiry involves 1860 tons of 6-inch and 1270 tons of 4-inch pipe. Some of the mills have been selling a little more tonnage of merchant pipe but this has been for very extended future delivery. On some lots this week five months delivery was named.

Bids on 10,045 tons of pipe for the Random road main contract No. 31 of the Baldwin-Fairmount reservoir project were received on June 22. No disposition of this tonnage has been made as yet. The Joseph Co., is low bidder on 1100 tons of pipe required for the Superior road project. Bids will be opened July 13 on two miles of 24-inch pipe, totaling 1000 tons.

Small Lettings Received

Birmingham, Ala., June 25.—Pressure pipe makers here still are receiving a few lettings, in the main in small tonnages. The American Cast Iron Pipe Co. has booked an order for 3225 tons for Los Angeles and 517 tons for Jacksonville, Fla. The United States Cast Iron Pipe & Foundry Co. received 700 tons from Dayton, O., and 500 tons from Woodward, Okla. The National Cast Iron Pipe Co. has also received some small business. Readjustment of freight rates on pipe from the district to California points by water is looked for Aug. 1, and protest will be made by the producers. In the meantime there is a heavy shipment to the western coast. Sanitary pipe business also is slow and while much is heard of a curtailment in production shortly, nothing definite as yet has been done in that direction, all plants still operating to capacity.

Small Lots Rule

Chicago, June 26.—With practically all pipe shops well filled for several months, there is less competition for business and the absence of large inquiry is welcome. Most current business is in small lots placed without competitive bids and taken by producers to cover the needs of their regular customers. At present, bookings about equal production and the backlog is not being reduced. Prices continue steady and an incentive to shade is offered. Bids were to be opened June 25 at Joliet, Ill. on 300 tons and July 26 at Gridley, Ill., on 350 tons.

Installing Handling Yard

Crane equipment for the handling of scrap and other material is about to be installed by the McKinney Steel Co., at its Cleveland plant. A contract for fabricating a runway, requiring 700 tons of steel, has been awarded to the McClintic-Marshall Co., Pittsburgh. Two cranes each of 10 tons capacity will be required, the contract for these not yet having been awarded. Work on the runway will begin at an early date.

Sheet Output Slowing Up

Consumers Urging Delivery Before Mills Close for Hot Weather —Some Tonnage Offered for Fourth Quarter

SHEET PRICES, PAGE 1853

Pittsburgh, June 26.—Sheet mills are concerned principally with shipping out material on order to satisfy the wants of their customers. In a few cases shipments are in excess of incoming orders and exceed production due to the fact that for several days past output has been affected by hot weather. In many cases it has been impossible to keep hot mill men at work and operations are 10 to 12 per cent lower than formerly. This condition will continue to a greater or less extent throughout the summer and it is doubted if the general average of operations will exceed 80 per cent until September or October.

Mills of the American Sheet & Tin Plate Co. would have to operate throughout the third quarter at the best rate they ever have reached in order to discharge obligations by the end of September. This is more or less true of some of the independent producers. Customers becoming familiar with this situation are bringing pressure to bear to receive increased shipments. Others already are presenting tonnage for shipment in the fourth quarter. These orders are not being entered but are held until the opening of the books for that period, which will not take place until some time in August. In some cases the tonnages involved are exceedingly attractive.

Prices are fairly well established although concessions in black sheets, while not traceable here, are reported available in other sections; hence the market continues quotable at 3.75c to 3.85c, base Pittsburgh. Galvanized sheets remain firm at 5.00c and blue annealed at 3.00c to 3.25c. Full finished automobile sheets still are quoted at 5.35c to 5.70c, and while the majority of sheet suspensions are confined to this grade, this is due to the fact that sizes for the new automobile models to come out in July have not as yet been decided upon. Diemakers and builders of auto bodies are working night and day. One shop in Philadelphia is employing 1400 to 1500 diemakers outside of its own force in order to catch up.

New York Central in Market

New York, June 26.—Inquiries have been issued by the New York Central railroad for its third quarter requirements of sheets representing a maximum of 750 tons of various grades.

Quote 3.35c On Black Sheets

Youngstown, June 26.—Hot weather is interfering with operating schedules and sheet production is on a reduced basis. Producers are making every effort to execute their obligations on time but in a number of cases this appears to be impossible on account of the setback experienced last week when many hot mill day crews in this district were unable to work a full turn. While 92 per cent of the sheet mill capacity here is engaged this week production probably will not exceed 70 per cent. The majority of sheetmakers here have sufficient tonnage on hand to afford two to three weeks rolling but with a one-week shutdown just ahead and the difficulty of operation under hot weather conditions, common belief is that the mills will have sufficient business to carry them well into August when it is expected that buying will resume on an active basis. Black sheets still are the weakest grade in the market from the standpoint of demand and while price shading is reported, these rumors lack foundation as far as this district is concerned. In fact 3.85c, Pittsburgh, was quoted against an inquiry for 1800 tons of black sheets by four district producers last week. Blue annealed tonnage is being sought actively with some producers taking tonnage at 3.00c, Pittsburgh, and some at $5 a ton higher. One producer has been compelled to close his books because of curtailed output.

Sheet Users Want Shipments

Chicago, June 26.—Consumers of steel sheets are using every effort to expedite and increase deliveries, as their need for material is great and production has been diminished by the hot weather. Mills in the West are sold up as far as they desire to go and the only source of additional sheets is from eastern mills. Prices continue steady at 3.00c for blue annealed, 3.85c for black and 5.00c, Pittsburgh, for galvanized. Some producers are asking 3.25c for 14 and 16 gage blue annealed. Continuance of hot weather probably will cut into production still more.

Demand Continues Good

Philadelphia, June 26.—One eastern sheetmaker will shut down for the entire week of July 4. Another will be closed for July 4 and the remainder of the week. Sheet demand continues good, particularly on contract specifications. Consumption is very heavy. Eastern mills are about booked up for the third quarter. Prices are unchanged at 3.00c to 3.25c, Pittsburgh, or 3.32c to 3.57c Philadelphia, for blue annealed, and 5.00c for galvanized. The usual price on black is 3.85c, Pittsburgh. The state of New Jersey is inquiring for a big block of black sheets.

Strip Production Cut

STRIP PRICES, PAGE 1853

Pittsburgh, June 26.—Hot weather is curtailing production of hot-rolled strip steel to a marked degree, at a time when in the experience of two or three leading makers demand is heaviest for the hot-rolled grade. Pickled stock is particularly popular and makers are well filled up for the third quarter; some room is left for a limited amount of plain black business. The price is unchanged at 3.30c, base Pittsburgh. Cold-rolled strip demand is fair, practically all mills having good order books and specifications are liberal. This market is firm at 5.25c, base Pittsburgh, reports of concessions under that level being unconfirmed.

Shape Buying Picks Up

Awards More Numerous Although for Small Tonnages—Some Tendency Exists To Await Lower Prices—Heavy Tonnages Are in Prospect

STRUCTURAL SHAPE PRICES, PAGE 1853

New York, June 26.—Structural business is being made up principally of a fair number of awards ranging from 200 to 600 tons. The situation can hardly be described as brisk, but more interest is being shown than a week or so ago. As a matter of fact, considerable work is pending, and some jobs postponed a few weeks ago, are now becoming active. The settlement of the bricklayer's strike, although on the basis of their demands for a $12 day for a period of two years, is regarded as a contributing factor in this recent improvement.

With some of the mills forced to curtail their operations owing to hot weather and in view of the good volume of business on their books, shape prices continue steady at 2.50c, base Pittsburgh, or 2.84c, New York. No material weakening is noted in prices on fabricated material. While some fabricators are said to be able to do less than three months, these cases are exceptional on anything like a fair sized tonnage.

The general contract for the approaches to the New York-New Jersey vehicular tunnel, requiring 4500 tons of structural shapes was awarded to Rodgers & Hagerty, Inc. In addition at least 200 tons of cast iron pipe will be required for this approach.

Lull in Demand Reappears

Cleveland, June 26.—Inactivity in the local structural shape market during the past week was reflected by the absence of awards and inquiries calling for large tonnages. The only large award in this district was that of 700 tons for a scrap yard crane runway for the McKinney Steel Co., the contract being placed with McClintic-Marshall Co. Inquiries were featured by that of 600 to 800 tons of shapes for the Akron Savings & Loan association building, Akron, O. Awards of steel totaling from 15 to 40 tons and inquiries for the same amount are holding up well. There is little tendency to shade 2.50c to 2.60c, base Pittsburgh, the general market price. A slight easing in shipments has appeared as the result of the recent lull in new business.

Lower Prices Expected

Boston, June 26.—Labor wage difficulties have been satisfactorily adjusted during the past week and this gives a better tone to the structural steel market. Nevertheless, buying is dull. Apparently fabricators and other consumers are looking for lower prices. Tonnage already bought is well covered with actual work so that heavy buying is expected before fall. The price is 2.40c to 2.45c Pittsburgh for small shapes and 2.50c for standard sizes.

Awards More Numerous

Pittsburgh, June 26.—Awards are slightly more numerous, as reported in this district this week, although none of the new business is located nearby. For instance, the American Bridge Co. was successful in taking transmission tower orders in Detroit and Toledo, O. involving about 800 tons. The McClintic-Marshall Co., was the successful bidder on the work for the McKinney Steel Co., Cleveland, using 700 tons. A like tonnage of plate girders for miscellaneous bridges for the Big Four and the Peoria & Eastern railroads has been awarded the McClintic-Marshall Co. Plain material is unchanged at 2.50c, base Pittsburgh. Deliveries are much sought after but on new orders are as much deferred as ever.

Demand Larger Than Expected

Philadelphia, June 26.—Demand for structural shapes continues larger than expected, with the eastern mills getting eastern business mainly, but also receiving considerable western and middle western tonnages. New orders are not averaging sufficiently large to replace shipments at present, shipments continuing heavy. The price on plain material continues at 2.50c, base Pittsburgh, or 2.82c, Philadelphia, and this level is not being shaded as far as is known.

West Continues to Build

Chicago, June 26.—With considerably less pressure for contracts for structural steel, buying of this material continues steady indicating that building is being kept up well. Recent contracts were for buildings of a general character for semi-public use and a tonnage of steel for a railroad bridge. The price situation on structural shapes is unchanged at 2.60c for delivery at convenience and 2.70c, Chicago mill, for third quarter. It is doubtful if the latter delivery can now be obtained by any producer in the Chicago district.

STRUCTURAL CONTRACTS PLACED

Building awards this week..... 8,737 tons
Building awards last week..... 14,773 tons
Building awards two weeks ago.. 12,379 tons

1400 tons, Schwartz and Gross loft building, New York, to Hedden Iron Construction Co.

800 tons, building for the American Piano Co., New York, to the Hay Foundry & Iron Works.

700 tons, plate girders for miscellaneous bridges for the Big Four and the Peoria & Eastern railroads, to McClintic-Marshall Co.

700 tons, work for McKinney Steel Co., Cleveland, to the McClintic-Marshall Co.

600 tons, loft for Blum & Blum, West Thirty-eighth street, New York, to Hedden Iron Construction Co.

500 tons, transmission tower work for Detroit-Edison Co., Detroit, to the American Bridge Co.

485 tons, widening Folsom street bridge, Milwaukee, to American Bridge Co.

422 tons, Kern General hospital, Bakersfield, Cal., to William G. Reed, Long Beach, Cal., to reinforced concrete.

400 tons, commercial building, Hartford, Conn., to Berlin Construction Co.

400 tons, office building, for the Public Service Production Co., Newark, N. J., to the Hay Foundry & Iron Works.

400 tons, apartment at 620 Park avenue, to the Hay Foundry & Iron Works.

385 tons, building for Washington Park National bank, Sixty-third and Cottage Grove avenue, Chicago, to Reuter Brothers.

352 tons, raw material storage building, Rapid City, S. Dak., for South Dakota state cement commission, to Crown Iron Works.

350 tons, substation for the New York Edison Co. at 177th street, to Hedden Iron Construction Co.

300 tons, transmission tower work for the Toledo-Edison Co., Toledo, O., to the American Bridge Co.

250 tons, addition to buildings of Westinghouse Electric Co., Sharon, Pa., to Somersville Ornamental Iron Works.

200 tons, an addition to the plant of the United States Metals Refining Co., Carteret, N. J., to American Bridge Co.

150 tons, plant addition for American Woolen Co., Lawrence, Mass., to New England Structural Co.

150 tons, highway bridge for Pennsylvania railroad, Trenton, N. J., to McClintic-Marshall Co.

115 tons, ice plant at Huntington, Pa., to McClintic-Marshall Co.

100 tons, additional building for Public Service Production Co., Newark, N. J., to Hay Foundry & Iron Works.

STRUCTURAL CONTRACTS PENDING

4500 tons, approaches on New York side of New York-New Jersey vehicular tunnel; New York; Rodgers & Hagerty, Inc., general contractors.

1500 tons, building for General Electric Co., West Philadelphia, Pa.; pending.

800 tons, insurance building, Philadelphia; bids asked.

750 tons, turntables for the Lehigh Valley; bids withdrawn temporarily.

700 tons, Masonic Temple, Nashville, Tenn.; bids asked.

600 to 800 tons, building for the Akron Savings & Loan association, Akron, O.; bids in July 5.

410 tons, 10 plate girder spans for Missouri Pacific railroad; bids in.

330 tons, girder spans and towers for Chicago & Alton railroad; bids in.

200 tons, building for Smith college, Northampton, Mass.; bids asked.

200 tons, plate girder span for Philo power plant, Philo, O.; bids in.

150 tons, machine shop and engine house, St. Albans, Vt., for Central Vermont railroad; bids in.

135 tons, five steel and concrete bridges in Grant county, Oreg.; bids in June 25.

110 tons, building for J. O. Jackson, Denver, Colo.; bids in.

Car Surplus Continues

Washington, June 26.—Railroads continue to pile up a surplus of freight cars in spite of loadings topping 1,000,000 cars a week. In the June 8-15 period the daily average surplus of freight cars was 51,988 and the daily average shortage 12,787, compared with a surplus of 41,106 cars and a surplus of 12,978 in the first eight days of June. The demand for coal cars is slightly in excess of the supply, but the net box car surplus is 28,163 daily.

The loading of freight cars in the week ended June 9 totaled 1,013,249 cars, of which 190,149 were coal, 14,804 coke and 76,092 ore. In the preceding week 932,041 cars were loaded.

Alaska Mining Gains

Washington, June 26.—The value of Alaska mine production in 1922 was $19,506,365 compared with approximately $17,000,000 in 1921, states the federal bureau of mines. The increase of $2,500,000 was due largely to the increased copper production. The Alaska mining industry in 1922 embraced some 3800 men, of whom 1000 were engaged in prospecting and mine development.

Mine Operations Heavy

Washington, June 26.—In a report upon fluorspar mining in the western states Raymond B. Ladoo, mineral technologist of the bureau of mines, states that with one exception all deposits worked have been so small or so far from transportation or contain fluorspar

mixed with silica or barite or both, that profitable production of gravel grade of fluorspar acceptable to eastern steel mills under present standards has been impossible and the future seems no more promising. Again with only one exception, the most accessible ore from the mines which have been worked has been removed. The production of acid fluorspar west of the Mississippi river from ore bodies now known probably will not exceed 100 tons annually, Mr. Ladoo reports.

Slight Advance Reported in Cost of Living

Clothing prices and rents advanced, while coal prices declined during the month ending May 15, the National Industrial Conference board, New York, reports. The increase in the composite cost of living amounted to 1.2 points, or eight-tenths of 1 per cent. Food prices remained unchanged during the month. The cost of living among wage earners' families in the United States on May 15 was 60.3 per cent higher than in July, 1914. Between July, 1920, when the peak of the rise since 1914 was reached, and May 15, 1923, the cost of living dropped 44.2 points or 21.6 per cent. The accompanying table gives further percentage comparisons of the total and individual items.

Living Costs Compared

July, 1914 to	All items	Foods	Shelter	Clothing	Fuel and light	Sundries
Jan., 1922	61.4	50	69	56	78	78
Feb., 1922	57.7	42	69	56	77	77
Mar., 1922	54.7	39	65	56	74	74
Apr., 1922	54.8	39	65	55	74	74
May, 1922	54.9	39	65	56	74	74
June, 1922	55.4	41	65	53	74	74
July, 1922	55.6	42	65	54	74	74
Aug., 1922	54.5	39	65	53	81	72
Sept., 1922	55.6	40	65	55	87	72
Oct., 1922	57.1	43	65	57	87	72
Nov., 1922	58.4	45	67	60	86	71
Dec., 1922	58.9	47	67	56	87	71
Jan., 1923	58.1	44	67	60	87	71
Feb., 1923	57.5	42	67	62	87	71
Mar., 1923	59.2	42	70	68	86	73
Apr., 1923	59.1	43	70	67	80	73
May, 1923	60.3	43	72	74	78	73

Mine Operations Heavy

Duluth, June 26.—Iron ore shipments from mines in the Hibbing district are estimated to be the largest in five years. Operations in the Biwabik district are increasing. Cuyuna range operations are the largest in history. A new record in output of manganiferous ores is expected. Officials are figuring on shipping 60,000,000 tons of ore this season from the Lake Superior district.

To Blow Out Stacks

Pittsburgh, June 26.—Several blast furnaces in Pittsburgh and valley territory have been blown out or will be blown out within the next few days. The Republic Iron & Steel Co. has blown out one of its Hazelton group at Youngstown; the Youngstown Sheet & Tube Co. is about to put out a stack and Edmund W. Mudge & Co. will do likewise in the near future.

The plant of the Ashtabula Steel Co., Ashtabula, O., was shut down June 25 for three weeks.

Roads Seek Deliveries

Press Mills for Steel—Advance of $2 on Extra Heavy Rails Generally Waived—Illinois Central in Market for 60,000 Tons of Rails

RAILROAD TRACK MATERIAL PRICES, PAGE 1853

Chicago, June 26.—Activity of railroads continues in the steel market, not only for finished steel and for car repair work, but also in covering requirements for rails and track fastenings for a part of next year. An inquiry for 60,000 tons of standard rails has been put out by the Illinois Central railroad in which is included the tonnage desired by the Central of Georgia. Probably the Tennessee Coal Iron & Railroad Co. will provide about half this tonnage for southern use. The same railroad has placed contracts for 10,000 kegs of spikes and bolts for 1923 delivery.

With large tonnages of track fastenings on their books, steel mills find railroads are pursuing them constantly to obtain better deliveries. This indicates the heavy volume of track work now being undertaken. Several other inquiries for standard steel rails are under consideration, including 6000 tons for the Pere Marquette railroad and a number of small lots for various roads. The same is true of miscellaneous inquiry for track fastenings but mills are unable to take all the business in these lines which is offered, because of inability to meet delivery requirements. Car buying is at a low level with practically nothing placed during the last week. New inquiry for cars is negligible also.

Domestic Demand List Less

New York, June 26.—While domestic demand continues listless, export buying of industrial and standard gage cars is brisk. One established exporter here states the quarter now closing will be considerably better than the first three months of this year, and that that period was more than twice as active as the corresponding period in the preceding year. Much of the recent business has been from South America and Cuba, there being a particularly good demand from the sugar interests. Until a couple months or so ago, the sugar growers had been practically out of the market for two years. A recent export order calls for 150 standard gage cars for Cuba.

Inquiries have been issued by the New York Central railroad for 2000 steel axles and 2000 tires for third quarter needs. Bids are to be taken July 2.

The Boston & Maine railroad is in the market for 10 locomotives of the Santa Fe type, and 10 of the Pacific type.

Large Buying Still Deferred

Pittsburgh, June 26.—Light rail orders still are fair, large buying being held up pending improvement in the coal market which would be followed by increased coal mining operations. Several single carload orders are received each day and occasionally one for three or four carloads at a time. The price is unchanged at 2.25c, base Pittsburgh.

The Bethlehem Steel Co., which, as reported last week, announced a $2 per ton extra on 110 to 130-pound rails, has withdrawn this extra for the time being. Track accessory demand continues heavy, railroads everywhere buying relatively small lots which go to make up a large aggregate. They are not anticipating as far ahead as they did several weeks ago but all are pushing for deliveries of material on order. Intermittent labor shortages interfere with delivery service from the spike makers. The Louisville & Nashvillle railroad purchased 500 kegs of standard spikes, dividing the order evenly between two independent makers here. Neither cancellations nor hold-up instructions have been received, which lends strength to the situation. Standard spikes are unchanged at 3.15c, small at 3.75c, boat and barge at 3.50c to 3.75c, and tie plates which are being bought in lots of 100,000 to 500,000 plates at a time are quoted at 2.60c to 2.75c, base Pittsburgh. Demand only is fair for track bolts, larges ones being quoted at 4.00c to 4.25c and small at 5.00 to 5.50c, base Pittsburgh.

Extra $2 on Heavy Rails Waived

Philadelphia, June 26.—The proposed extra of $2 per ton on standard steel rails of 110 to 130 pounds announced last week by an eastern maker is being waived in local business and tonnages are being booked by railmakers at generally the same basis as before. The Pennsylvania railroad placed 15,000 tons of rails with the Carnegie Steel Co., and the Philadelphia & Reading railroad 10,000 tons with the Bethlehem Steel Co. Both tonnages were placed at $43, base mill, for second half delivery.

CAR ORDERS PENDING

Boston & Maine railroad, 200 refrigerator cars, 300 flat cars and 100 underframe ballast cars; pending.

New York Central railroad, repairs on 1000 miscellaneous cars; bids asked.

Hold Company Picnic

Pittsburgh, June 26.—The second annual picnic of the Jones & Laughlin Steel Corp.'s general office employes was held June 23 in Carrick park, Carrick, Pa. Children's games, athletic contests, sports and a dance featured the outing. About 500 officers and employes, with their families and guests, attended. The general committee in charge of the affair included: A. E. Crockett, W. L. Jones Jr., W. T. Mossman, J. W. Miller, E. L. Resler, A. W. Herron Jr., W. Ford Moreland, G. C. Davis, Miss F. M. Schempp, F. M. Harbison, and W. H. Hirsch.

The offering of $8,000,000 Wheeling Steel Corp. Wheeling, W. Va., 6 per cent gold notes has been oversubscribed about 40 per cent. The total subscription ran approximately $11,000,000. The notes were offered at 100 and accrued interest to yield 6 per cent, and are due July 1, 1926, callable on 30 days notice at 103 to 101 and convertible at the option of the holder into 5½ per cent bonds at 98.

The Nonferrous Metals

Prices Continue Down in Dull Trading, Except Aluminum and Antimony—Zinc and Tin Positions Adverse

	Copper Electro delivered	Copper Lake delivered	Spot Straits New York	Lead† New York basis	Zinc St. Louis basis	Spot† aluminum	Spot antimony	Nickel spot
June 20....	15.12½	15.25	40.87½	7.25	5.90	26.00	6.75	29.00
June 21....	15.00	15.25	40.25	7.00	5.85	26.00	6.87½	29.00
June 22....	15.00	15.25	40.50	7.00	5.82½	26.00	7.00	29.00
June 25....	15.00	15.00	40.87½	7.00	5.75	26.00	7.00	29.00
June 26....	15.00	15.00	40.37½	7.00	5.72½	26.00	6.90	29.00

†Outside market quotation.

NEW YORK, June 26.—The nonferrous metal markets have been extremely slow, with prices in some cases easier and in others showing practically no change. The stock exchange failures last week injected increased caution into already conservative buying policies and purchases have been almost entirely for "must" requirements. The Ruhr occupation and its paralyzing effects on continental industry, continue an important factor in the world metal markets and are felt in the markets here.

Copper prices settled down to 15.00c delivered, the past week, at which level almost any tonnage of copper could be bought for prompt or third quarter delivery. Export business has been slow, European buyers being partly influenced by the recent failures of exchange bankers in New York. A fair business has been done with China. Casting copper has been selling fairly freely at 14.50c, refinery. Consumers of electrolytic are operating at a high rate and their shipments are heavy. New business, however, is light and they are covered for the most part against orders on books. The principal aim now is to get orders shipped.

Zinc prices have been declining steadily at the rate of about 5 points a day. Sales were made June 25 at 5.75c, East St. Louis, the low price for the year, but today 5.70c could be done. Statistically, the tendency is wrong, but actual stocks of metal at smelter are subnormal, less than seven days' supplies. However, buyers have been afraid to buy on the declining market and lacking speculative support as well as consuming demand, there has been nothing to check the decline. High grade prices have been holding unchanged at 8.25c to 9c, delivered.

The American Smelting & Refining Co. reduced its lead contract price June 21 $5 a ton to 7c a pound. New York and outside and independent sellers accordingly reduced their prices to the same level. The St. Louis market also was reduced from 6.90c to 6.75c, with some sales made on June 25 at 6.75c. The market has been quiet, but there has been no heavy pressure to sell lead and in general the situation in lead appears better than in most other metals.

The shipments of tin from the Straits the first half of June amounted to 3100 tons and in view of expected small world deliveries this month an increase in the world visible is expected as of July 1. In consequence speculative sentiment has been rather bearish in London and in New York and prices have been weak ranging between 39.87½c and 40.87½, this week. Spot has been commanding a premium of about one-half cent over futures. Ninety-nine per cent tin has been scarce and commanding a price only about one-fourth cent under spot Straits.

The aluminum market has been firm. Relatively heavy purchases by some large users in the outside market have reduced such supplies and prices have accordingly become stronger. One importer continues willing to take business at 26c, New York, 26.50c, Detroit, for the 98 to 99 per cent grade. For the 99 per cent grade of virgin ingot 27c to 27.50c, New York, is asked.

Antimony prices have recovered about one-fourth cent to 7c duty paid, for spot carlots. Chinese sellers of 99 per cent metal are holding for 5c, c. i. f. in bond. The market has been quiet.

Mill Products

Base prices cents per pound, f.o.b. mill

SHEETS	
Copper, hot rolled, 24 oz., min	24.25
High brass	20.50
Zinc, ga. 9 to 18 (plates ½c less)	8.90
Lead, full sheets (cut ¼c more)	10.75
Aluminum, base 18 ga. and up...	35.40
SEAMLESS TUBES	
High brass	25.50
Copper	27.00
RODS	
High brass, round, ⅜ to 2½ inch	18.75
Naval brass rod	21.00
WIRE	
Copper	18.00 to 18.25
High brass	22.25

Old Metals

Dealers' buying prices cents per pound

HEAVY RED BRASS	
Cleveland	9.50 to 10.00
New York	9.25 to 9.50
Chicago	9.50
HEAVY YELLOW BRASS	
New York	6.50 to 7.00
Chicago	7.00
Cleveland	6.50 to 7.00
ZINC	
New York	4.25
Cleveland	3.00 to 3.25
HEAVY COPPER AND WIRE	
Cleveland	11.50 to 12.00
New York	11.50 to 12.00
Chicago	11.00 to 12.00
RED BRASS TURNINGS	
New York	8.75 to 9.00
Cleveland	8.50 to 9.00
Chicago	9.00
YELLOW BRASS TUBING	
Cleveland	6.00 to 6.50
NO. 1 BRASS ROD TURNINGS	
Cleveland	6.00 to 6.50
New York	6.75 to 7.00
Chicago	7.00
ALUMINUM BORINGS	
Cleveland	10.00 to 11.00

Electrical Industry To Furnish Copper Demand

Based on estimates published by the electrical industry which places total expenditures for transmission lines to be erected during 1923 at $125,000,000, the market for copper in that field is placed between 215,000,000 and 200,000,000 pounds for high voltage transmission lines alone, according to figures given out by the Copper and Brass Research association. The estimated expenditures of $900,000,000 for transmission line construction in the United States during the next five years will afford a market for copper wire and cable between 900,000,000 and 1,500,000,000 pounds.

Figures furnished by the Southern California Edison Co., engaged in the largest hydroelectric development in the world, show a present use of 26,694,000 pounds of copper in service on its system. On its 60,000 volt transmission lines there are 8,838,000 pounds and on the 30,000 volt lines 740,000 pounds. It is estimated that in 1922 there were 6,000,000 pounds of copper purchased.

Receives Piping Contract

One of the largest piping contracts let in recent years recently was awarded to B. Floersheim & Co., Pittsburgh, by the Carnegie Steel Co. This order calls for furnishing and erecting complete piping installations at the Carnegie company's Clairton by-product coke works, Clairton, Pa. The contract includes furnishing and erecting materials for steam, exhaust, water, air and gas. The entire installation will be Crane Co. materials throughout with the exception of certain few specialties. The materials will range in sizes from the smallest up to and including 66-inch. Shipments of the material will begin in four to five weeks and construction started within two to three months. It will be completed in a year. The Floersheim company also is furnishing materials for the Koppers Co., which is installing the by-product ovens at Clairton.

Denies Furnace Project

Denial of a report that it planned to erect a blast furnace plant at or near Menominee, Mich., has been made by the Bethlehem Steel Corp. through H. E. Lewis, vice president of the company. Mr. Lewis in a letter to a Marinette, Wis., newspaper stated that the Bethlehem company has no plans at the present time for the purchase of land at Menominee as a site for a blast furnace.

Iron Ore Imports Larger

Philadelphia, June 26.—Iron ore imports for the week ending June 23, in this port showed a large gain over those of the preceding week. From Cuba 11,000 tons were received while Germany sent 580 tons, Newfoundland, 8400 tons, Algeria 7890 tons and Sweden 9302 tons. Fifty tons of manganese ore was received from Germany.

Northwest Business Falls

All Lines of Industry Experiencing Recession—Westbound Freight Movement Heavy Due to Rate Increases Effective Aug. 1

SEATTLE, June 22.—Activity in iron and steel in the Pacific Northwest is not as marked as it was 60 and 90 days ago but the turnover is still satisfactory. Unquestionably iron and steel are following the condition of general business. The present recession is regarded as only temporary.

Lumber prices have dropped slightly and the demand from some quarters is considerably less. Consequently water freight rates are easier. These conditions combined with the approaching Fourth of July holiday in logging camps and mills account for a lessened demand for iron and steel products used in this industry. Building is still active but present high prices have caused the postponement of several large projects and the rejection of bids in a number of cases.

Jobbers on this coast complain that deliveries from Atlantic manufacturing centers by water are still uncertain and many large houses find it difficult to keep stocks complete. Although there is more tonnage on the intercoastal route than ever before, the movement of westbound freight is unprecedented. Effective Aug. 1, an advance of from 25 to 50 per cent in water freight rates is stimulating buying in order to take advantage of present low freights. Sufficient notice, however, of the change has been given the trade so that it is thought jobbers have been able to cover their immediate requirements at going rates.

Pig Iron and Coke

While prices may be a trifle easier than last week the market shows little change. The best grades of United Kingdom iron are selling at around $40, all paid, although buyers are endeavoring to better this figure. Only the better grades are in favor in the Portland and Puget Sound districts although in San Francisco importers are finding some market for French, Indian and Chinese iron the latter two about equal to No. 2 domestic. These varieties are selling at about $34 c.i.f. Importers regard the present softness in the market as temporary as they consider business conditions as a whole well stabilized.

There is no marked change in the coke market. Conditions are about the same as last week, Fernie supplying the bulk of the demand in this section.

Bars, Plates and Shapes

These items are steady both as to demand and prices. Reinforcing and merchant bars are about in equal demand and jobbers report a heavy turnover. The local steel mill is operating two open-hearth furnaces having considerable work on hand. Several large contracts are pending.

Other Finished Material

Jobbers report continued demand for practically everything in stock. Sheets are moving more actively but dealers here and Tacoma are still selling 50 cents under prices prevailing in Portland, due to local conditions. Logging and lumbering are buying their regular requirements although this industry is not purchasing as heavily as a few weeks ago. After July 4 the demand is expected to resume in full force. Uncertain and delayed deliveries are still causing considerable complaint among jobbers. Building hardware and materials used in improvement projects are showing a large volume of sales.

Old Material

Scrap dealers report indifferent demand although conditions are practically unchanged from a week ago. Stocks are low but sufficient for present needs. Prices show signs of declining and sales are largely forced. ess logging and lumbering demand is having an effect upon the foundries and the latter in turn require a smaller volume of scrap. However, dealers are not discouraged, believing that the situation will improve later in the summer. Exporters of steel scrap are unable to do much business with Japan owing to high freight rates and the refusal of steamship lines to handle loose scrap. The cost of providing containers is an added handicap. Japan is still much interested in purchasing rerolling scrap rails which are firm at around $20. About 500 tons of this material has been sold for export within the last few days. Country mixed steel scrap is quoted at about $14, selected at $15 to $18 while No. 1 cast iron scrap is fluctuating at $24 to $25.

Foundry Operations Show Slight Improvement

During May Ohio foundries operated at 81.12 per cent of normal, as compared with 79.9 per cent of normal in April, according to the monthly trade report compiled by the Ohio State Foundrymen's association, Cleveland. These figures indicate the extent of the recovery of the foundry industry, since May, 1922, operations were at the rate of only 48 per cent. The normal melt for May, or the capacity of all the foundries reporting to the association was 28,328 tons, while the actual melt, or production of castings, was 23,192.5 tons.

Total stocks on hand, including both pig iron and scrap iron, totaled 23,303.22 tons and represented 82.2 per cent of the normal melt. During April the corresponding figure was 82.2 per cent, while during May, 1922, it was 101 per cent. Stocks received during May, including pig iron, both spot and contract, and three grades of scrap, totaled 15,961 tons. As compared with the normal melt this amounted to 56.34 per cent, against 70.52 in April and 42 per cent in May, 1922. Nonferrous foundry operations for May were at 72.13 per cent of normal, while in April operations were on a basis of 79.2 per cent.

Steel Merger Injunction Dissolved by Court

The preliminary injunction recently granted to the Allied Chemical & Dye Corp. against the proposed merger of the Youngstown Sheet & Tube Co., and the Steel & Tube Co. of America, was dissolved June 21, in the court of chancery in Wilmington, Del. If no appeal is taken, the final obstacle to the merger has been definitely removed and the two companies will be consolidated on or before July 2. The Allied Chemical & Dye Corp. sought an injunction against the transaction because it contended the value of the Steel & Tube Co. of America was considerably more than the price offered by the Youngstown company. The Youngstown bid was $35,000,000. New York bankers are proceeding with plans for the consummation of the merger and this will be made possible through a temporary loan of $33,000,000 to the Youngstown company, as not enough time remains between now and July 2 to prepare details for a bond issue.

Remarkable improvement in business of Steel & Tube Co. of America is reflected in its report for the first quarter of 1923, which shows net profits of $2,207,415 after taxes and all charges. For 1922 the company showed a net profit of $472,420, which was $705,548 short of covering preferred dividend requirements for that year. In 1921 it showed a net loss of $2,571,352 and in 1920 a net profit of $6,315,209. On December 31, 1922 the company had $1,670,445 cash, against $1,146,413 at the close of 1921 and $1,589,874 on December 31, 1920.

The Ozone Appliance Co., 78-80 West Water street, Milwaukee, manufacturer of electrical goods, recently filed a voluntary petition in bankruptcy. Liabilities aggregating $58,963 are unsecured. Assets of $126,587 are claimed but $100,000 of this amount is valuation of patents. Merchandise is valued at $16,874.

Nonferrous Subjects

Feature A. S. T. M. Meeting—Urge Adoption of New Standards

Nonferrous interests featured the opening session of the twenty-fifth annual meeting of the American Society for Testing Materials at Chalfonte-Haddon Hall, Atlantic City, June 25. After reports of committees and the presentation of papers announcement was made of the election of officers to serve the coming year, as follows: President, Guilliaem Aertsen, Midvale Steel & Ordnance Co., Chicago; vice president, W. H. Fulweiler, chief chemist, United Gas Improvement Co., Philadelphia. Those elected members of the executive committee were J. H. Chubb, manager service bureau, Universal Portland Cement Co., Chicago; H. L. Scott, Henry L. Scott & Co., Providence, R. I.; and P. H. Walker, chemist, United States bureau of standards, Washington.

Committee B-2, on nonferrous metals and alloys, William Campbell, chairman, recommended the following tentative standards be advanced to standard: Specifications for pig lead; for brass pipe, standard sizes; and for copper pipe, standard sizes; also tentative methods of chemical analysis of brass ingots; of bronze bearing metals; and of nickel. The subcommittee on sand-cast metals and alloys reported the investigation of the subject of a standard test bar well under way, a number of manufacturers of cast metals, including the U. S. bureau of standards, having started a series of comparative tests on a test bar, the requirements of which have been specified by the committee.

Other committees reporting were the committee on copper wire, J. A. Capp, chairman; committee on screen wire cloth, R. W. Woodward, chairman; and committee on metallurgy, W. H. Bassett, chairman. The latter committee submitted proposed tentative recommended practice for photography as applied to metallography and also recommended for adoption tentative methods for the metallographic testing of nonferrous metals and alloys.

The paper on methods of casting test specimens of gun metal by E. H. Dix Jr., chief of the metallurgical branch, engineering division, air service, McCook field, Dayton, brought out strong discussion as to the intent of the test bar.

It was admitted that the test bar does not represent the casting and it was urged that the society state in its specifications that the strength of the casting should be considered in a stated ratio to the strength of the test piece thereby clarifying the interpretation of results and data obtained in experimental tests.

In a written discussion on the tin situation Lawrence Addicks says that both of the American plants smelting tin are being closed because they can no longer be operated profitably. He says that there has been a certain amount of agitation for an import duty on refined tin entering this country, but this is being opposed by tin plate manufacturers who are doing a large export business.

Steel and cast iron formed the principal tops of the sessions on Tuesday and Wednesday when the committees on steel and on cast iron gave their reports. These sessions will be reported in IRON TRADE REVIEW of July 7.

Tuesday evening was devoted to the annual presidential address, delivered by George K. Burgess, after which an informal dance and smoker was held.

Auto Production in May Reaches New Record

Washington, June 26.—The department of commerce announces May production of automobiles was 393,263 passenger cars and trucks. The computation is based on figures received by the bureau of the census in cooperation with the National Automobile chamber of commerce and covering approximately 90 passenger car and 80 truck manufacturers each month. The total marks a new high record for any one month. The passenger car production was 350,180 and that for trucks was 42,983. The record of automobile production over recent months follows:

Passenger Cars

	1923	1922
January	223,706	81,693
February	254,650	109,171
March	*319,638	152,959
April	*344,474	197,216
May	350,180	232,431

Trucks

	1923	1922
January	19,398	9,416
February	*21,817	13,195
March	*34,681	19,761
April	*37,527	22,342
May	42,983	23,788

*Revised.

To Complete Hearing

Chicago, June 26.—Resumption of the hearing in the Pittsburgh basing point case by the federal trade commission has been postponed to June 27. Testimony in the hearing will be completed at Chicago July 3 on this case.

Canadian Output

Shows Gain for Iron and Steel—Ferroalloys Also Increased

Toronto, Ont., June 25.—The report of the dominion bureau of statistics shows that production of steel ingots and castings in May was 104,079 tons, compared with 92,598 in April. The output in May, 1922, was only 17,000 tons. Steel production in the first five months of May, 1923, was 380,263 tons, as compared with an output of 144,275 tons for the corresponding period of 1922.

Pig iron production in May was 101,533 tons, being the highest monthly output since October, 1920, when 104,774 tons was produced. The output in May, 1922, was 23,363 tons. Production in the first five months of 1923 was 335,696 tons, or an increase of 172,272 tons over the output of the same period in 1922. The output of ferroalloys in May was 2289 tons as compared with 2256 tons in April. The cumulative production for the five months ending May, was 10,825 tons, being an increase of 6514 tons over the corresponding period last year.

The capital of Moose Mountain Ltd. has been increased from $2,000,000 to $9,814,140.

The British Columbia Electric Railway Co., Victoria, B. C., is preparing to go ahead with a construction program that will involve some $10,000,000 and greatly increase the power capacity of its mainland plants. It is the intention of the company to increase its power from 153,000 to 269,000 horsepower. Actual construction work on the new power units will be started as soon as the provincial government gives its formal sanction to the company's plans. It is expected that the proposed additions to the company's plants will be sufficient to meet the requirements for the province for the next 15 years. As soon as the government gives authority the company will proceed to build a dam at the mouth of the Alouette lake, also to drive a tunnel 3,900 feet long between it and Stave lake and there develop 10,000 horsepower at the mouth of the tunnel, taking advantage of the difference in the elevation of the two lakes. It is proposed to construct the largest plant near Ruskin which will have a capacity of about 80,000 horsepower.

The American Metal Parts Mfg. Co., 1916 St Paul avenue, Milwaukee, manufacturers of automobile bumpers, is a voluntary bankrupt with liabilities of $48,673 and nominal assets of $97,631. Unsecured claims are $32,563.

Americans Buying Scotch Iron

Orders Booked for Shipment to Atlantic and Pacific Coasts—Germans' Selling in Scandinavian Countries Shut Out Some Material from United States —French Cease Taking American Coke

Iron Trade Review Staff Cable

European Headquarters,
IRON TRADE REVIEW,
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LONDON, June 26.—A few hundred tons of Scotch foundry iron have been sold for delivery to the Atlantic seaboard of the United States, while heavier tonnages have been closed for the Pacific coast, at £5 17s 6d ($27.08) f.o.b.

Germans have renewed aggressive selling in the Scandinavian markets, where special efforts have been made to maintain deliveries, shutting out American producers on all commodities except galvanized sheets and certain other specialties.

Business in the iron and steel markets generally is dull. One British blast furnace stack has been blown out and some mills are shutting down for three weeks. Producers are taking a firmer stand on prices but are hampered by merchants underselling them, although the merchants are believed to be near the end of their low priced stocks. Sheetmakers continue to receive heavy specifications. Melting scrap has been sold down to £3 15s ($17.28). The market for ferro-manganese reflects the weakness which exists in American sales.

The French correspondent of IRON TRADE REVIEW reports from Paris that the French government fuel syndicate has ceased buying British and American coke, although receipts from the Ruhr have been barely 4000 tons daily. Buyers are inactive. Belgian prices are firmer.

Reports from the Ruhr show that the passive resistance strike continues undiminished. The German North sea shipyards are urgently in need of plates and shapes but are not buying material, claiming they are unable to pay current prices.

Changes in British iron and steel prices in the week bring the following products to the levels as quoted: Scotch plates £9 5s ($42.64); English home plates £9 10s ($43.80); East coast hematite £5 14s ($26.28); West coast hematite £5 15s ($26.51); Derbyshire No. 3 foundry iron £5 2s 6d ($23.63) and Northamptonshire No. 3 foundry £5 ($23.05).

Sterling exchange is figured on a basis of $4.61.

Foreign Steel More in Evidence; Prices Lower

European Staff Special

BIRMINGHAM, Eng., June 15.—After resisting the pressure of consumers for months, the large steelworks have reduced their prices for joists, sections, angles, channels, bulbs, etc., by 5 shillings ($1.15) per ton, making the basis for joists and sections £10 ($46.10). All the price revisions are not yet published, but a statement is current that some firm have made the reduction 10 shillings ($2.30).

There are no indications as yet that new business has been stimulated. One reason may be the somewhat altered situation on the Continent. There is an impression abroad now that Stanley Baldwin the premier is bringing a fresh mind to the problem, it may be possible to effect a settlement of the Ruhr problem. It is assumed that any measure of success would liberate a lot of foreign steel, thereby bringing increased competition and lower coke prices. The coke question dominates the situation, and whenever the foreign market for this fuel loses its sharpness pig iron will become cheaper.

Prices of semifinished steel are easier, £8 5s ($38.03) now being quoted on billets, though it is not supposed that this is the minimum price to any customer prepared to take a good tonnage concessions being almost certain.

Sterling—$4.61

Foreign steel is more in evidence. Belgian billets can be brought here at £7 7s 6d ($33.99) delivered, although £7 10s ($34.54) is a more general quotation. London merchants are issuing elaborate lists of finished material, accompanied also by weekly rolling lists, and appear to be doing their best to meet English requirements in regard to tests and specifications.

Joists are offered at £7 15s ($35.72) f.o.b. Antwerp, equal to £9 ($41.49) delivered here, angles at £8 ($36.88), pit rails at £8 15s ($40.33), bars £8 2s 6d ($34.45) and hoops at £12 ($55.32). A whole range of quotations are included for fencing and bolt and nut bars. The merchants claim to send either French or Belgian material at their option. The offers have led to the placing of orders. The sending of weekly rolling lists in this instance is a new departure. Where delivery is urgent, the English mills are able to ship supplies within two or three days.

The finely-cut British prices carry no profit, and some comment has been aroused by the fact that the Parkgate Iron & Steel Co., which has been running practically full time for the last eight or nine months, is unable to pay a dividend. It is now obvious that the firms have been running for weeks on orders placed two or three months ago.

Makers of pig iron are in a position of increasing difficulty, and some of them look forward to an early damping down or blowing out of furnaces. This is mainly due to the high price of coke. In the Middlesbrough area, the fuel costs £2 3s ($9.91) per ton delivered, and in the Midlands about £2 ($9.22), the price in Barrow being £2 8s ($11.06). The maker of pig iron with coke of current quality bases his fuel consumption on a calculation of 1½ tons per ton of iron produced, equal to £3 ($13.83) spent on fuel.

The Middlesbrough makers have reduced No. 3 iron to £5 17s 6d ($27.07) and the same figure now applies to hematite mixed numbers. Derbyshire foundry is down to £5 5s ($24.20) and Northampton to £5 2s 6d ($23.62). The persistent witholding of orders has compelled some of the Middlesbrough makers to commence stocking iron.

The Barrow district is working largely on old contracts, and ferro-manganese still is exported to America in good quantities, even at the comparatively high price of £20 ($92.20) per ton. High grade West-coast iron continues to go in fair tonnages to the

Current Iron and Steel Prices of Europe

Last Reported Prices Converted into Dollars at Rates of Exchange, June 25

British Market

Home Market Prices. Gross Tons at Works or Furnace

Corrected to Date by Cable

Semifinished Steel	$	£ s d
Billets, soft steel	35.73	7 15 0
Sheet bars	35.73	7 15 0
Wire rods	55.32	12 0 0
FINISHED STEEL		
Steel bars, England, ½ to 3-inch	46.10	10 0 0
Steel bars, England, ½ to 3-inch, for export	43.80	9 10 0
Plates, ship, bridge and tank, England	43.80	9 10 0
Plates, ship, bridge and tank, Scotland	42.64	9 5 0
Beams, England	42.64	9 5 0
Beams, Scotland	42.64	9 5 0
Sheets, black, 24 gage	57.63	12 10 0
Sheets, galvanized, 24 gage	55.32	12 0 0
Rails, 60 pounds and over	46.10	10 0 0
Rails, 60 pounds and over, for export	43.80	9 10 0
Tin plate, base box, 108 pounds	5.30	1 3 0
Steel hoops	55.32	12 0 0
Steel hoops, for export	54.17	11 15 0
PIG IRON		
Hematite, East Coast, Mixed Numbers	26.28	5 14 0
Hematite, West Coast, Mixed Numbers	26.51	5 15 0
Basic, Middlesbrough	26.51	5 15 0
No. 3 Foundry, Middlesbrough	26.51	5 15 0
No. 3 Foundry, Derby, Leicester, Nottingham	23.63	5 2 6
No. 3 Foundry, Northamptonshire	23.05	5 0 0
No. 3 Foundry, Staffordshire	24.20	5 5 0
No. 3 Foundry, Scotch	25.36	5 10 0
Ferromanganese, 76 to 80 per cent	82.98	18 0 0
Ferromanganese, 76 to 80 per cent	92.20	20 0 0
COKE		
Yorkshire furnace	6.45	1 8 0
Yorkshire furnace, for export	12.68	2 15 0
Yorkshire foundry	8.07	1 15 0
Yorkshire foundry, for export	12.68	2 15 0

Where no separate export prices are given, same quotations apply to domestic and foreign business.

German Market

Prices Last Reported

PIG IRON	$	Marks per metric ton
Hematite, Oberhausen	13.86	1,630,000
Foundry, No. 3, Oberhausen	13.57	1,597,000
Bessemer Stahleisen, Siegen	13.55	1,594,000
Foundry, No. 1, Oberhausen	13.60	1,600,000
Luxemburg Foundry	17.22	2,026,000
COKE		
Ruhr furnace	2.75	324,000
Ruhr foundry	2.88	338,700
SEMIFINISHED STEEL		
Billets	15.55	1,829,000
Sheet bars	17.09	2,010,000
Wire rods	16.55	1,947,000
FINISHED STEEL		
Standard rails	16.87	1,985,000
Merchant bars	19.20	2,259,000
Structural shapes	19.05	2,241,000
Ship plates	21.70	2,553,000
Medium plates, 3 to 5 millimeters	24.13	2,839,000
Sheets, below 3 millimeters		nominal
Tin plate		nominal
Plain wire	20.46	2,407,000
Bands and strips	23.16	2,725,000

All prices are f.o.b. furnace or mill.

French Market

Prices Last Reported

PIG IRON	$	Francs per metric ton (2205 lbs.)
Hematite, Lorraine	26.58	430
Basic bessemer, Lorraine	24.11	390
Foundry, Longwy, No. 3, sand-cast	23.49	380
Foundry, Longwy, No. 3, chill-cast	24.11	390
Ferromanganese, 76 to 80 per cent	95.83	1,550
COKE		
French furnace	8.35	135
German furnace, f.o.b. frontier*	11.13	180
German furnace, f.o.b. frontier**	15.46	250
French foundry	8.96	145
SEMIFINISHED STEEL		
Blooms	30.29	490
Billets	32.77	530
Sheet bars	43.28	700
FINISHED STEEL		
Standard rails	34.00	550
Merchant bars	39.57	640
Angles	39.26	635
Normal beams and profiles	39.26	635
Plates, ship and tank, 10 millimeters and thicker	43.59	705
Plates, bridge and tank, 5 to 10 millimeters	44.82	725
Sheets, black, 3 millimeters	47.30	765
Sheets, blue annealed, 2 millimeters	51.31	830
Shafting, cold-drawn, 40 to 60 millimeters	86.56	1,400
Bars, 2 per cent nickel steel	111.29	1,800

All prices are f.o.b. furnace or works.
*Up to 50 per cent of normal requirements.
**Over 50 per cent of normal requirements.

Belgian Market

Prices Last Reported

PIG IRON	$	Francs per metric ton (2205 lbs.)
Basic bessemer, Belgian	21.14	400
Basic open-hearth, Belgian	28.80	545
Gray forge, Belgian	14.27	270
Foundry, No. 3, Belgian	23.78	450
Foundry, No. 3, Luxemburg	23.25	440
Foundry, No. 3, Lorraine	23.25	440
SEMIFINISHED STEEL		
Blooms	26.43	500
Billets	28.27	535
Sheet bars	29.60	560
Wire rods	37.52	710
FINISHED MATERIAL		
Standard rails	38.32	725
Merchant bars	30.92	585
Normal beams and profiles	30.92	585
Plates, 5 millimeters and thicker	35.41	670
Sheets, black, 3 millimeters	37.52	710
Sheets, galvanized, 1 millimeter	93.81	1,775
Plain wire	59.46	1,125
Galvanized wire	68.71	1,300
Wire nails	62.10	1,175

All prices are f.o.b. furnace or works.

Midlands, Glasgow and South Wales, while Germany, France and Belgium continue good buyers. The district has shared in the general reduction, mixed numbers falling to £6 10s ($29.96), delivered Sheffield, or around £5 17s 6d ($27.07) at the furnace, about equal to the Northeast coast level. Rubio ore has a falling tendency, the lastest business being on the basis of £1 4s ($5.53) per ton c. i. f., Middlesbrough.

There is a certain amount of interdistrict competition. Cleveland prices in spite of the recent reduction still are at least 10 shillings ($2.30) per ton above those of Derbyshire and Northamptonshire, although the margin is reduced when transport charges are added. The difference, however, partly accounts for the absence of stocks in the Midlands and the slightly firmer condition of prices. The general demand from engineers, and especially from the Staffordshire iron trade, is small and prices consequently have a falling tendency.

The Staffordshire iron trade is almost stagnant. Common bars can be bought at £12 ($55.32) and second grade nut and bolt iron is available at £11 5s ($51.86). This competes with No. 3 Belgian material delivered in the Birmingham area at £8 10s ($39.18). No great quantities are being bought, the nut and bolt trade being depressed partly as the result of the trouble with the boilermakers. Conditions are increasingly stringent through the rise of 7½ per cent in ironworkers' wages lately declared as the result of the higher prices obtained early in the spring.

The galvanized sheet trade continues one of the most hopeful features of the iron and steel business. The exports during May were 52,911 tons as against 42,658 for the corresponding period of last year, the five months total being 258,013 as against 230,012. The mills still are very well off for orders and the slight easing of prices is not to the same extent as in other departments due to the lack of business. The minimum is now £19 ($87.59) for 24 gage corrugated.

Little new business has come in for tin plate, but here again the export figures continue to show expansion. During the month of May the amount exported was 54,059 tons as against 39,455 in May of last year. For the five months the total was 231,591 tons as against 183,434, a substantial increase. The Far East is in the market with some desirable new business but there is not much home buying.

The labor trouble in the tin plate

(*Concluded on Page* 1896)

Which Way Is Business Headed?

Midyear Brings Trade in Atmosphere Heavily Charged with Doubt—Outlook Perplexing with Conflicting Factors, Favorable and Unfavorable, at Work—Economic Doctors Disagree in Analysis of Conditions

BY JOHN W. HILL

THREE months ago the industrial skies were remarkably clear and undisturbed. Production was making gigantic strides, prices were rising and confidence was at high tide. Gradually this picture has undergone a sweeping change. Future buying has diminished. Commodity values have weakened and the stock market has suffered a severe decline. Midyear finds business in an atmosphere heavily charged with doubt and uncertainty.

What is wrong? Have the foundations of prosperity been struck down, or is business fleeing from the harmless shades of 1920? Does the present lull mark the beginning of an extended depression, or will a new forward rush of trade and of prices come shortly? These are the outstanding economic riddles of the moment.

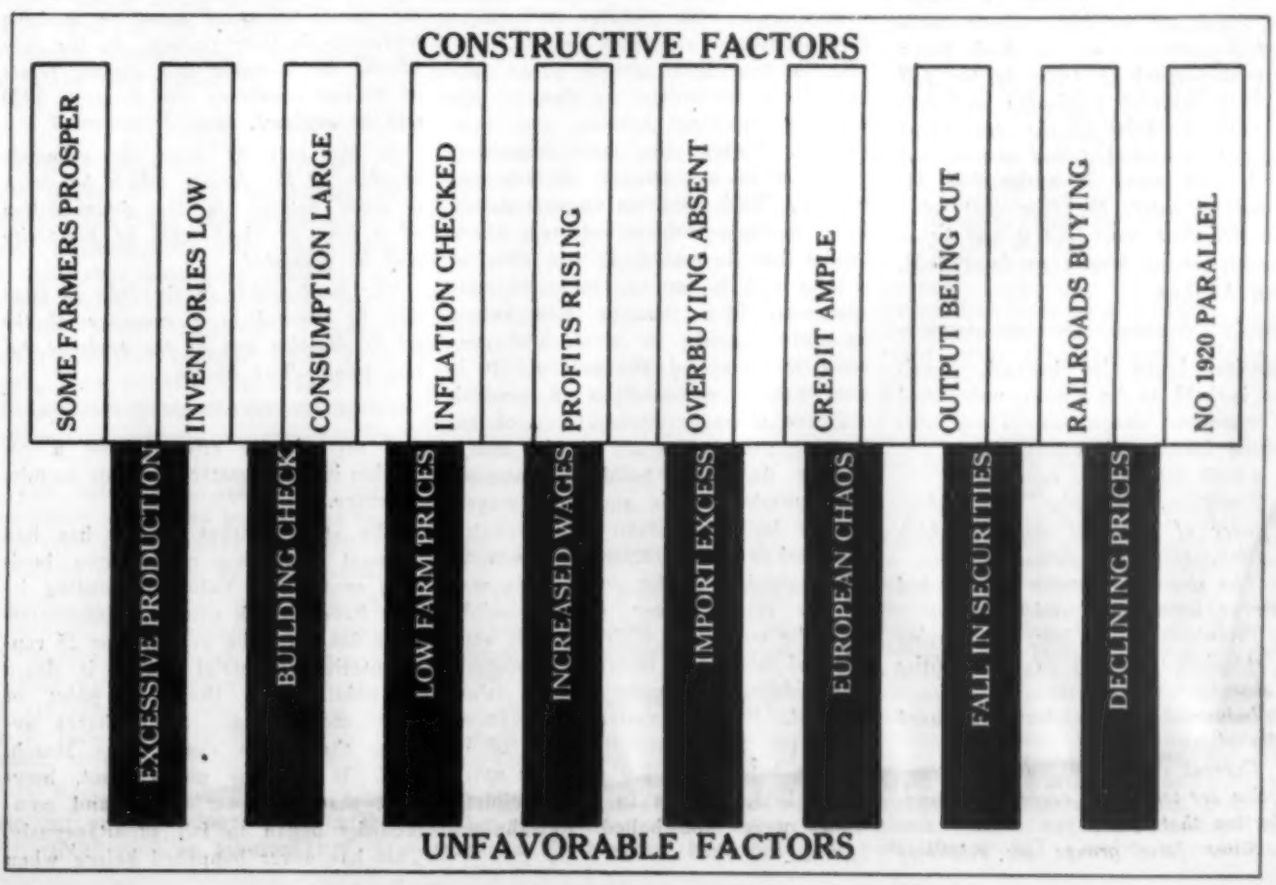
Not in years has the situation been so difficult of fruitful analysis. Bearing upon the underlying trend are both favorable and unfavorable factors. Contradictory interpretations are to be drawn from the profusion of conflicting influences. Moreover, the staggering economic upheavals of the war have created lingering maladjustments of colossal extent and of untested ultimate significance.

Small wonder that the outlook is so extraordinarily baffling. Small wonder that economic doctors cannot agree upon a diagnosis of the situation. The writer recently has talked with many practical business men, bankers and trained economists in the West and in the East. The divergent shades of opinion developed in these interviews strikingly reflected the vast range of present perplexities. Broadly speaking, however, best informed students of business are divided into two distinct groups.

One of these groups believes that the great industrial activity this spring was largely to make up the depletion of goods caused by the recent depression. It sees this filling up process now mostly completed and maintains that demand is lacking to justify such large scale outputs indefinitely. The inevitable conclusion is that prosperity has reached its crest. Some important economic authorities go much further than this. They believe that good times are definitely and surely on the wane. Numerous impressive considerations are marshaled in support of this view. Some of the most outstanding of these follow:

1. *Production is in excess of current requirements.*
2. *The building boom is flattening.*
3. *European conditions remain chaotic and the world's economic balance has not been restored.*
4. *The United States is piling up a huge excess of imports.*
5. *The labor shortage and widespread wage increases threaten business profits.*
6. *The prices of farm products are relatively low and the farmer is at a tremendous economic disadvantage.*
7. *Prices are falling and the con-*

The author is financial editor of IRON TRADE REVIEW.



fidence of buyers' has been shocked into a state of timidity not conducive to vigorous trade.

8. *The stock market, regarded as a barometer of future trade movements, has suffered a serious slump since March.*

The other group declines to place an adverse construction upon these factors. On the contrary it views the situation as fundamentally sound. It regards the present lull as due partly to physchological and partly to seasonal causes. It is described as a temporary dip between two mountain peaks of activity with the valley of depression lying far beyond. Pessimism is held to be wholly unjustified and, moreover, dangerous. These constructive factors are advanced:

1. *Credit supplies are enormous.*
2. *Employment is large, the purchasing power of industrial classes is high and consumption is extremely heavy.*
3. *The spread of caution has checked dangerous inflationary tendencies.*
4. *Inventories are low; overbuying and speculative holding of commodities are absent or virtually so.*
5. *Industrial profits have increased despite rising costs.*
6. *Current curtailment and large consumption are tending to correct any overproduction that exists.*
7. *Some farm groups are relatively well off, and there has been some improvement in all agricultural sections over* 1922.
8. *Savings have increased, and prohibition has had a salutary effect upon the thrift and efficiency of wage-earners.*
9. *The railroads are prosperous; their large purchases form an important factor of support for iron and steel and general industrial activities.*
10. *There is little in the present situation which justifies comparison with* 1920.

No Precedent in 110 Years

Examination of these various considerations discloses one remarkable and outstanding fact. It is that men are now talking of the possibility of a business depression at a time of easy money and untold available credit resources. Fifteen times during the past 110 years American business has passed through a crisis. In the last analysis, one of the leading factors in causing these has been the exhaustion of credit and high interest rates.

In most cases bank loans were overexpanded by an outburst of trade and speculative excesses. Prices were inflated and large unwieldly inventories piled up to burden the credit machinery. It is an impressive fact that none of these common characteristics of the closing stages of previous prosperities exists today. If good times are to depart without their appearance, a new chapter will have been written in economic history.

It is true that certain other factors, long recognized as danger signals of expiring booms, are now present. Among the most important of these is a measure of overproduction. This condition unquestionably exists in the petroleum industry, where output has increased 40 per cent in a year and is far in excess of consumption. It is true to some extent in cotton goods, in wool, and possibly in tires and automobiles. It is not true of commodities in general.

Other characteristic features of retreating prosperities all present today, include dwindling building, slumping stock market values and high wages. In the building industry the country launched a $6,000,000,000 program at the beginning of the year. This was 20 per cent greater than possibly could be completed with available supplies of labor and material. Competitive bidding for materials and labor resulted. Building materials advanced to 35 per cent above the level of 12 months before and 100 per cent more than 1913. Wages in the building trades were "snowballed" to fabulous figures.

The cost of building has soared to 104 per cent above the prewar basis. As a result, residential building has been checked and many large projects are being postponed. It was an inevitable and an entirely healthy development that the so-called "builders strike" created. The amount of construction already under way and planned is enormous. It will keep the industry fully occupied at least until fall and general business should feel no adverse effects from a recession in this quarter for some months to come.

The stock market decline has had a most disturbing effect upon business sentiment. Values of leading issues have shrunk nearly $2,000,000,000 since March. The average for 25 representative industrial shares is down 14 points from the high point of three months ago. Steel shares average the lowest range since March, 1922. It may be pointed out, however, that this year stocks and commodities began to fall simultaneously. This has never happened before when

No Experts Agree

WHEN economic doctors disagree what are plain mortals to do? Recently I have talked with some of the country's leading economists and business statisticians and to each I put this question: "What is wrong with business?" There was startling variety in the answers. They ranged from the cheering assurance that the situation is perfectly sound and healthy, to the doleful verdict that the world is desperately sick and out of balance and that the outlook is not hopeful. Classifying the views, it is found that of the total of 18 *economic diagnosticians consulted, most of them recognized authorities,* 10 *maintianed that the termination of good times was not an immediate probalility. Eight were equally certain that business was now definitely headed for much lower levels of activity. Some well-known forecasters look for high prices and a new spurt of trade in the fall with good business continuing well into* 1924. *On one point all the students of business to whom I talked are agreed. This is that there is nothing in the situation to justify the fear that when the decline does come that it will be as precipitate or as drastic as in* 1920-21.

—THE AUTHOR.

Analysis To Be Complete

THE accompanying article by Mr. Hill introducers a series of pertinent studies of the favorable factors of the present complex business situation. This series of articles is based on a progressive study of the situation extending over a number of months supplemented by special interviews with leading bankers, business men and economists at New York and other business centers. The author is endeavoring to present a straightforward, common-sense portrayal of the present divergent business tendencies with particular reference to industrial business. This should be helpful to those who, charged with the responsibility of forming concise business opinion and of future planning, find themselves perplexed and disturbed by the present contradictions.

In the July 5, *issue, the author will consider production and consumption and the manifestations of sound or unstable tendencies in these factors. In the July* 12*issue the common and similar points of present conditions and those of* 1920 *will be analyzed.*

In the July 19 *issue the economic position of the farmer which has such a large bearing in the determination of a long or short term of prosperity will be presented.*

The final article in the July 26 *issue will be devoted to a summary of the whole situation and of the probable future trend.*—THE EDITOR.

the stock market was forecasting a major decline of business. Stocks, in those cases, have preceded the movement of commodities by some months. The recent severe drop was accentuated by the wave of Wall street failures. None of the insolvencies reflected any general financial stress.

Excessive wage increases are regarded as an outstandingly serious defect in the situation. The wage upturn started last summer. It received great early impetus from the union victory in the coal strike and the initial advance by the United States Steel Corp. in September. The National Industrial Conference Board, which follows wage changes throughout the country, has reported 1105 advances and 14 decreases in the past 10 months. In the month ended June 14 there were 288 wage changes, one of them a decrease.

Col. L. P. Ayres, one of the country's most eminent statisticians advances the interesting and novel theory that the shortage of labor and burdensome wage levels may have the same effect in restricting business profits and activities as tight money and high interest rates have had in the past.

On the other hand another authority, the Harvard Bureau of Economic Research, finds it is difficult to believe "that general manufacturing activity, with full employment at high wages, would bring prosperity to an early close in the absence of large inventory accumulations and during a period of easy money."

Restraint Checks Inflation

Another consideration constituting a new phase in recent economic experience has been the spread of business conservatism. Those who adopt the view that underlying conditions are sound, regard this development as one of the most important economic achievements of modern times. It reflects, they believe, the proven ability of the business community to control the sweep of the business cycle. By deliberately checking dangerous inflationary tendencies many competent authorities believe that business men actually have prolonged the period of prosperity by many months.

Early in the year some unhealthy tendencies were beginning to appear. Production was 25 per cent above estimated normal, prices had advanced 31 per cent above the 1921 low, and bank loans were increasing at the rate of $200,000,000 monthly. Interest rates were stiffening and the federal reserve board was importuned to save business from the whirlpool of inflation by advancing rediscount rates.

There was nothing in the position of the federal reserve system to justify such action. Rediscounts were 70 per cent below the 1920 peak. Gold reserves, representing 40 per cent of the world's total stocks, had increased 50 per cent in three years. The untapped credit resources of the system were estimated at nearly $15,000,000,000. Consequently no general advance of rates was made. However, in March the rediscount rates of the New York, Boston and federal reserve banks, were raised ½ to 1 per cent to a level with those prevailing in the nine other regional banks.

While this action was relatively unimportant it was interpreted as a warning to business men against repeating the excesses of 1920. Simultaneously warnings against inflation began to appear from a multitude of sources. Business men, recalling the painful lessons of 1920, were prompt to respond. A great tidal wave of caution swept over the land. The effect has been to reduce the volume of future commitments and cause a reversion to hand-to-mouth buying.

One phase of this development is of utmost significance. The "buyers' strike" has been largely confined to producers and distributors. It reflects their uncertainty regarding future values and demand. Meanwhile consumption has continued unabated and in large volume. This has been made possible by widespread employment and the fact that raw material advances have not been passed on the finished goods.

Although raw material values have increased 35 per cent since the low level of 1921 that of consumption or finished goods, as measured by the federal reserve board index, are actually 5 per cent lower. The purchasing power of wages, as computed by the national industrial conference board, is 33 per cent above the prewar level. The "strike" of distributors and the continued heavy demands of consumers form only one of the many contradictions in the present situation.

Scrap Prices Still Weak

(*Concluded from Page* 1854)

ups being recorded. Prices are unchanged but nominal in the absence of purchases.

Small Lots Predominate

Cincinnati, June 26.—Except for small lots for immediate shipment consumers are out of the market for iron and steel scrap. Trading is duller than at any time in months, with the downward trend in prices still in evidence. About the only transactions are between dealers. Consumers have fairly large reserves of scrap and because of a labor shortage not much buying is being done.

Prices declined from 50 cents to $1 a ton throughout the list during the week. Taking the market as a whole, much more scrap is coming out than is being consumed and the weight of this heavy supply is having its effect in the lower range of prices.

In some instances railroads are offering scrap to dealers before their lists are sent out in an effort to move it more quickly. The Big Four railroad has entered the market with a list aggregating between 8000 and 10,000 tons, which will close July 3. The Wabash railroad shortly will offer a list touching points in Indiana in which local dealers are interested. Forwardings by country dealers have tapered off.

Improvement Is Seen

St. Louis, June 25.—While still weak, the market for scrap iron and steel is more active than it has been in many weeks. Some minor reductions in dealers' lists were recorded, but there is evidence that prices are scraping bottom and that the price decline has about ended. Dealers have been taking considerable tonnages for laying down in their yards. Railroad lists recently appearing have been absorbed through this outlet. The industries are buying small lots. A more hopeful sign is that they are seeking bargains.

The present status is expected to continue through July when an improvement is expected. By that time mills and foundries are expected to make reductions in prices of finished goods, which will be possible with raw material $4 to $6 a ton cheaper, and with the melt continuing at anything like its present pace, the industries will be obliged to replenish stocks. In the immediate past there has been a movement in rolling mill grades, busheling and No. 1 wrought. An East side steel interest purchased approximately 6000 tons of steel specialties, which will take it out of the market for the 60 days. Rails for rolling and cast grades still are dull.

The movement of scrap from the country, especially from Southern points, has fallen to a minimum. Country yards are well depleted. Dealers report more than the usual volume of cancellations and rejections. Offerings by the carriers were smaller the only lists being that of the Chicago, Burlington & Quincy, 7000 tons and a blank list by the Big Four.

Demand Continues Dull

Birmingham, Ala., June 25.—Little buying of scrap iron and steel is noted in this territory though shipments continue brisk. Consumers are not disturbing contracts made some time ago and are asking for steady delivery. Some of the regular melters of scrap are keeping their stocks in good shape. Despite the fact there is a lagging in new business, capacity production continues. Inquiry brings out the fact that until present contracts are filled little effort will be made by consumers to purchase again. A few changes in quotations were made during the week.

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IN THIS ISSUE

June 28, 1923.

IRON AND STEEL MARKET REVIEW 1849
IRON AND STEEL MARKETS ..... 1850 to 1862
IRON, STEEL AND SCRAP PRICES 1853, 1912, 1916, 1920
AMERICANS BUYING SCOTCH IRON 1865
FOREIGN MARKETS 1865, 1866, 1896, 1897
WHICH WAY IS BUSINESS HEADED 1867
STOCK LIQUIDATION IS SEVERE 1872
BUSINESS TREND ..... 1873 to 1876
MILL PRODUCES SMALL SIZE TUBES 1877
ALLOYING ELEMENTS AFFECT STEEL 1883
FURNACE PLANT IS MADE MODERN 1885
MUST REDUCE ACCIDENT HAZARDS TO EYES 1886
USING AIR TO DESULPHURIZE COKE 1888
FOUNDRYMEN STUDY STEEL PRACTICE 1894
RAPID ADVANCE MADE IN WAGES 1898
NEW INTERCOASTAL RATES NAMED 1902
FIRE CLAY PRODUCTION HOLDS STEADY 1906
NORTHWEST BUSINESS SATISFACTORY 1907
BUYING OF TOOLS CONTINUES LIGHT 1908
CONSTRUCTION AND ENTERPRISE 1910
NEW TRADE PUBLICATIONS 1914

Trade Balance Still Adverse

THE excess of imports over exports for this country which appeared in March for the first time since 1914, has continued uninterruptedly for three months. In March the adverse balance was $56,827,000. In April it was $36,780,000 and in May it was $51,000,000. During these three months the country has piled up an unfavorable balance of $137,582,000. This foreign trade movement is pictured in the Business Trend. Including merchandise, gold and silver, the balance of trade in the first five months of 1922 was $225,000,000 in favor of this country. For all of these items during the same period this year a debit of $228,000,000 is shown.

This violent swing of the pendulum of America's international trade, has occasioned worldwide attention and comment. The development of an excess of imports has long been predicted as an inevitable result of this country's strong creditor position. It was assumed that the only way the debtor countries could meet their interest or pay off their obligations and regain a free flow of gold now concentrated here, was by sending goods here. This theory is sound and it may be that the inevitable process has started. Yet, it is a curous fact that although merchandise imports are heavy, gold continues to flow this way in large amounts and foreign exchange rates continue at an enormous discount compared with the valuation of the dollar.

The inflow of gold and the failure of exchange rates to recover, in the face of this shift of nearly half a billion dollars in the trade account, is attributed to the sharp decline of American purchases of European securities. These purchases were at the rate of more than $80,000,000 monthly. Moreover, it is necessary for the debtor countries who are paying interest, to make provision for meeting it. This of course helps to keep down the exchange rate. England recently paid an interest installment on her debt under the debt settlement which has now been fully completed.

Meanwhile the heavy import totals immediately reflect the great manufacturing activity in this country, this spring. The major portion of the increases in imports has been in raw materials.

Moreover, much of the gain represents high prices. In March import valuations were 55 per cent greater than in March, 1922. The increase as measured by tonnage of cargo ships was only 4 per cent. In April this year raw materials made up 39 per cent of the total imports against 32 per cent one year before. Manufactures ready for consumption amounted to 17 per cent of the aggregate against 23 per cent in April, 1922. Larger imports of wool, copper, hides, sugar and oil are indicated. This does not bear out the picture of some alarmists that the United States is being inundated with cheap foreign goods. Will the unfavorable balance persist?

In its current monthly review, the London Joint City & Midland Bank, Ltd., says this appears inevitable and capable of postponement only "if America fails to collect from Europe the interest on wartime loans or lends far more than is likely to foreign countries." The change in America's international status brought about by the war would have taken generations to accomplish under normal conditions, the British bank remarks.

New York Pays Unions Tribute

SINCE 1916, 242 wage agreements have been signed between employers and employes in the building industry in New York City. The latest agreement was in settlement of the bricklayers' strike which was holding up construction of public school buildings and other important work. Of the major trades engaged in building, 11 now are receiving more than double the daily wage they received in 1916; six are receiving just double their 1916 wages and the remainder have obtained substantial increases. Most trades get $10 to $12 a day from the Building Trades

Employers association, comprising the important contracting organizations while some independent contractors are paying $14 to $16 a day on smaller projects. The increase in labor costs is an important factor contributing to the holding up of new construction involving several hundred millions of dollars of expenditures in the New York district.

This is a situation which does not arise from immigration restrictions. Plenty of labor now in this country would jump at the chance to learn the trade of plastering or laying bricks, a trade which could be mastered thoroughly in a few months. But the demand for building trade labor on the one hand to take care of the construction held up by the war, and the exclusive attitude of the building trade labor unions on the other hand have created an ill-balanced condition in labor and one which cannot endure indefinitely. The public paid the bill for each of the 242 agreements in New York and the latest agreement was forced through by the mayor of New York who insisted that the employers in refusing to pay the advance were holding up school work and consequently acting contrary to the public welfare. All of which, economically speaking, might be construed as the process of killing the goose that lays the golden egg for everybody.

Better Balance in Pig Iron

THE most striking feature of the pig iron situation as it presents itself to some observers today is the great contrast between the record rate of production recently registered and the continuing low volume of new sales. Although there has been a slight increase in activity in the market for third quarter requirements the orders on books for that period do not amount to much more than two months' output at the current rate of blast furnace operations.

While phenomenal records were achieved in production in April and May, there was not a corresponding acceleration of new business, and the cautious attitude on the part of buyers has become more and more apparent at the approach of the new quarter. On previous occasions when there have been unusual bursts of speed in the rate of furnace operations, orders on hand have been much larger, in proportion; amounting in some instances to as much as six months' output at the rate the furnaces were producing. This was true in 1920.

Shipments have been heavy all through the second quarter, and iron has been going directly into manufactured products urgently needed. Toward the close of June, however, it has become apparent that certain melters would not be able to use all the tonnage they contracted to take before July 1, and piling of iron began at some furnace yards. The fact that the price of iron has been receding does not account for deferring of shipments of higher priced iron, as melters would rather be in a position to use high priced iron than low priced; nor does the reported labor shortage in some districts fully explain it. The more general cause for the dull period in the pig iron market is that melters are not yet convinced of a continuation of the volume of business they experienced in the second quarter. Naturally they prefer not to extend their purchases under the conditions which now prevail.

It is obvious, either that pig iron production will be slowed down considerably in the near future, or that melters will have to buy soon and in larger volume if they want to keep running at their present rate. Prospective demand is out of line with present production, but this does not mean that the former will have to move up entirely, or that the other will have to come all the way down. It is more likely that both will move toward a satisfactory plane; that there will be a more balanced state of affairs all around. This will mean good business for both consumers and producers.

Which Way Is Business Headed?

RARELY, if ever, has opinion regarding business prospects more sharply divided itself into opposing groups than at the present time. Minds trained to analyze and search out economic facts and tendencies by scientific rule, are no less lacking in agreement with respect to the future as are those of the common class of business men who are accustomed to make their judgments less from formula and more from practical experience. These judgments range all the way from the extreme of unlimited prosperity to that of acute depression. Business sentiment today seems to be decidedly confused because both the adherents of continued business expansion and those of sequential contraction can present some convincing facts in support of their beliefs. This divergence of opinion and the attendant psychological influence clearly is an important factor tending to interfere considerably with the normal development of the present business situation.

In this week's issue IRON TRADE REVIEW begins the publication of a series of articles by a member of its staff specially trained in business analysis, which defines and appraises clearly the strong and weak points of the present situation. Information of this kind seems to be peculiarly needed just at this time to keep the perspective straight and confidence within rational bounds. Probably business conditions in the next six months will neither measure up to the most sanguine expectations or down to the level of direst predictions. In any event, a careful examination of the fundamentals of the situation will be helpful.

Stock Liquidation Is Severe

Decline Sweeps Many Values to Low Levels—United States Steel Common Shares Down 19 Points from Year's High—Slump Reflects Trade Uncertainty and Wave of Wall Street Failures—Financial Situation Sound

BY JOHN W. HILL, FINANCIAL EDITOR

WEAKNESS has been pronounced in the financial markets recently. This applies to stocks, to bonds and to foreign exchange. It is also true of a number of commodities. Chief interest has centered around the severe liquidation of stocks. This was general and widespread at the beginning of last week. It was checked on Friday and Saturday, due to support of banking interests but broke out afresh again at the opening of the current week. Since the top of the market in March many leading shares have declined from 15 to 20 points, to the lowest levels in a year.

An index of what has happened is found in the movement of United States Steel Corp. common stock. At the high for the year this security was quoted at slightly above 109. Last week it had declined to a fraction above 90. That meant a depreciation in the market value of the entire issue of about $90,000,000 or over 17 per cent. Other steel stocks have fared equally ill and pressure has been severe on oil, copper and automobile shares. The railroad shares have been lightly touched by the flame of liquidation. This is partly because railroad issues have not enjoyed any extended advance and partly because of the exceptional earnings and good outlook for the roads.

What has caused the stock market decline? It has been due to two causes. One is the uncertainty in the business outlook. The other is the house cleaning wave in Wall Street. Numerous bucketshops have been wiped out and rotten conditions on the curb and Consolidated exchanges have been exposed. This has caused a shock to investors' confidence which has been accentuated by the failures of a number of old established stock exchange houses. These latter insolvencies involved houses having extensive dealings in foreign exchange, the fluctuations of which are responsible for the financial difficulties.

The situation in Wall Street has compelled large scale liquidation by weak houses. At the same time it has checked outside buying. It does not in any respect, reflect anything wrong with the general financial situation. This never was more sound. In a word Wall Street seems to be doing what it usually does—rushing to extremes and exaggerating developments. Because of the special circumstances applicable to the financial district alone, the stock market should not be taken too seriously as a barometer of business.

Index to Business Trend Charts

THIS ISSUE

Subject	Page
Business Index	1873
Freight Car Situation	1874
Railroad Freight Traffic	1874
Security Prices	1874
Foreign Trade	1875
Steel Castings Bookings	1875
Structural Awards	1875
Cotton Consumption	1876
Monthly Coke Output	1876
Prices and Failures	1876

REFERENCES

Aberthaw Index	June 21
Automobile Production	June 21
Bank Clearings	June 21
Electric Power Production	June 21
Monthly Incorporations	June 21
Monthly Ingot Production	June 21
Steel Orders	June 21
Wholesale Trade	June 21
Building Construction	June 14
Car Orders	June 14
Foundry Pig Iron Market	June 14
Iron and Steel Price Parity	June 14
Monthly Pig Iron Index	June 14
Railroad Earnings	June 14
State of Credit	June 14
Wage Factor	June 14
Coal Production	June 7
Copper Prices	June 7
Farmer Purchasing Power	June 7
Foreign Exchange	June 7
Independent Sheet Situation	June 7
Monthly Alien Migration	June 7
Dollar Purchasing Power	May 31
Monthly Commodity Prices	May 31
Iron and Steel Foreign Trade	May 24
112 Years of Prices	May 3
Building Cost Index	April 26
Freight Factor	April 19
Wages and Living Cost	April 5
Steel Earnings	Feb. 8
Iron and Steel Production Rate	Feb. 1
Steel Output Per Capita	Feb. 1
Commodity Prices	Jan. 11
U. S. Crop Production	Dec. 28
Long Time Trend of Wages	Aug. 3

The Barometer of Business

WEEKLY COMPARISON

	Last week	Week before	One mo. ago	One year ago	Average 1913
Business failures	320	322	355	391	300
Cash ratio Fed. Res. System	77.6	77	75.6	79.1	...
Loan rate, 4-6 Mo. N. Y. (per cent)	5	5	5-5¼	4	5¾-6
Aver. 25 ind'l shares	$105.75	$107.44	$109.92	$96.69	$58.19
Aver. 25 rail shares	$61.43	$62.19	$61.38	$61.49	$82.95
Ave. 40 bonds	$76.91	$77.60	$78.06	$79.95	$93.00
Car loadings (week ended June 9)	1,013,000	932,041	974,531	846,002	*930,976
Bank debits 247 cities (000 omitted)	$10,343,182	$8,799,074	$9,608,989	$9,740,057	.....

*1920.

FOREIGN EXCHANGE (Demand)

	Normal	June 25 (close)	Week before	Mo. ago	Yr. ago
Sterling	$4.86	$4.61¼	$4.62	$4.62	$4.38¼
Francs	19.3c	6.17c	6.19c	6.61c	8.44c
Lira	19.3c	4.44c	4.53c	4.78c	4.64c
Marks	23.8c	0.0008c	0.0006c	0.0017c	0.28c

MONTHLY COMPARISON

	May	Month before	Year ago	Monthly average 1913
Dodge building awards in 27 states	$380,719,000	$358,693,000	$362,590,000	$71,450,000
Business failures:				
Number	1530	1520	1960	1336
Liabilities	$41,000,000	$46,991,941	$44,403,000	$22,723,000
Exports	$319,000,000	$325,449,000	$307,568,000	$207,000,000
Excess of gold imports	$44,531,887	$8,533,000	$5,587,299	†$630,716
Bureau of Labor Price Index	156	159	148	100
Bradstreet's Price Index	144.3	147.8	128.8	100
Economist's British Price Index	4412	4440	4372	2717
Cost of Living Index	160.3	159.1	154.9	100
New incorporations	$817,229,000	$1,006,258,000	$938,195,000	$172,301,000
Railroad net earnings	*$83,197,800	$83,568,000	$49,919,000	$59,900,000

*April. †Monthly average excess exports.

The Business Trend

June 28, 1923

TRADE TODAY, TOLD BY IRON TRADE REVIEW CHARTS

GENERAL SITUATION—Monthly Business Index made slight increase in May to 46.7 per cent above 1913; rise due to gains in pig iron production, cotton consumption, coal output and freight movements; the volume of buildng and Bradstreet's wholesale prices declined; sentiment shows some improvement.

FREIGHT MOVEMENT—Total car loadings for week ended June 9 reached 1,013,000; daily average loadings for last three weeks reported are at high record, save for fall of 1920.

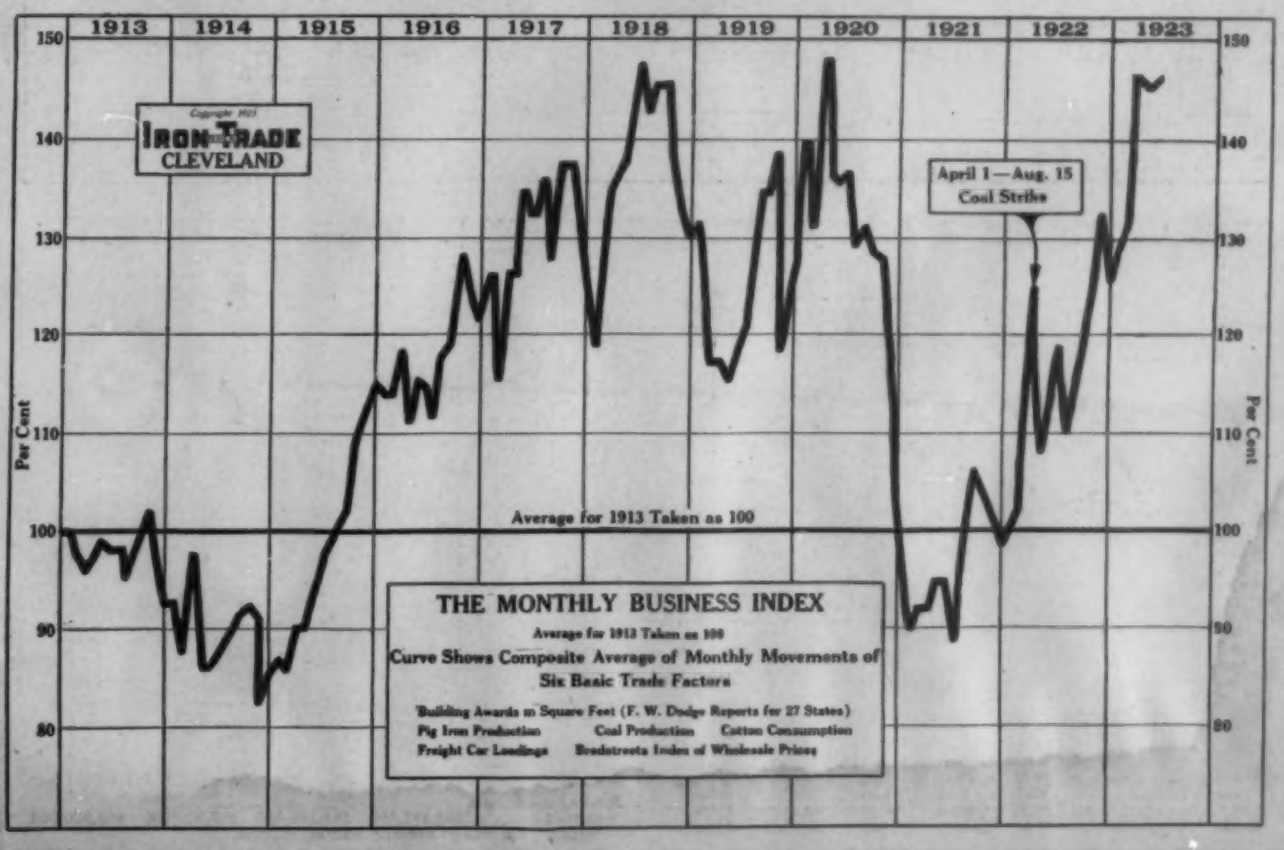
CAR SHORTAGE—With freight movements running at last fall's peak levels, when the car shortage reached 170,000 cars, railroads are now reporting a net daily average surplus of 16,000 cars.

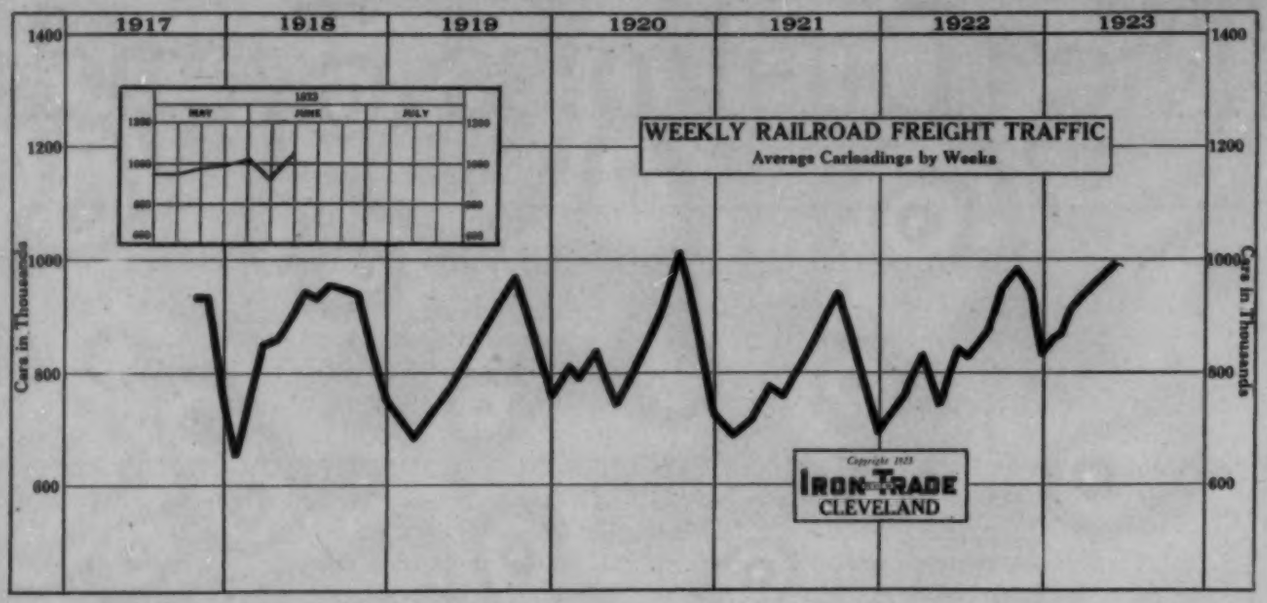
SECURITIES—Violent liquidation of stocks last week checked; was caused by failures of "bucketshops" and several more reliable brokerage houses; share averages touch new low for year.

COTTON CONSUMPTION—Takings of raw cotton by mills in May of 620,000 bales highest on record save for March 1923; mills now curtailing output on extensive scale.

STRUCTURAL AWARDS—Decline in structural awards reflects recession in volume of future building projects; per cent of shop capacity 58 per cent against 81 per cent in April.

COKE OUTPUT—May production by-product coke of 3,328,000 tons makes new high monthly record; Beehive output of 1,819,000 tons highest since early in 1920.




1917
1918
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1920
1921
1922
1923
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1200
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800
600
Cars in Thousands
1923
MAY
JUNE
JULY
WEEKLY RAILROAD FREIGHT TRAFFIC
Average Carloadings by Weeks
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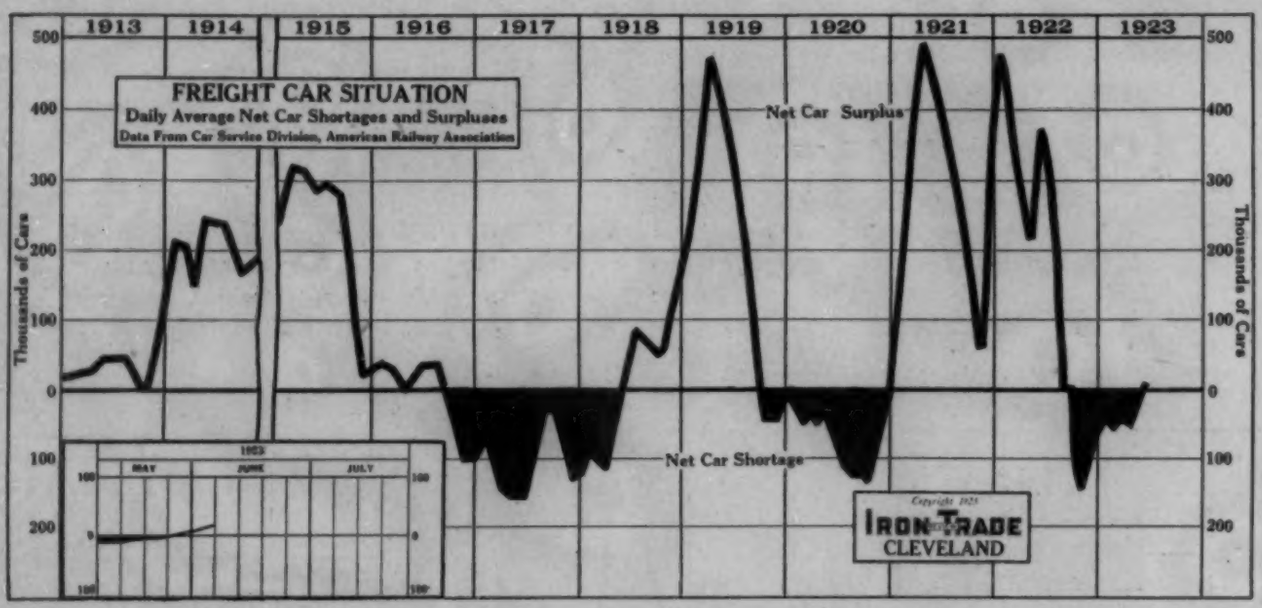
CLEVELAND


1913
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0
Thousands of Cars
FREIGHT CAR SITUATION
Daily Average Net Car Shortages and Surpluses
Data From Car Service Division, American Railway Association
Net Car Surplus
Net Car Shortage
1923
MAY
JUNE
JULY
Copyright 1923
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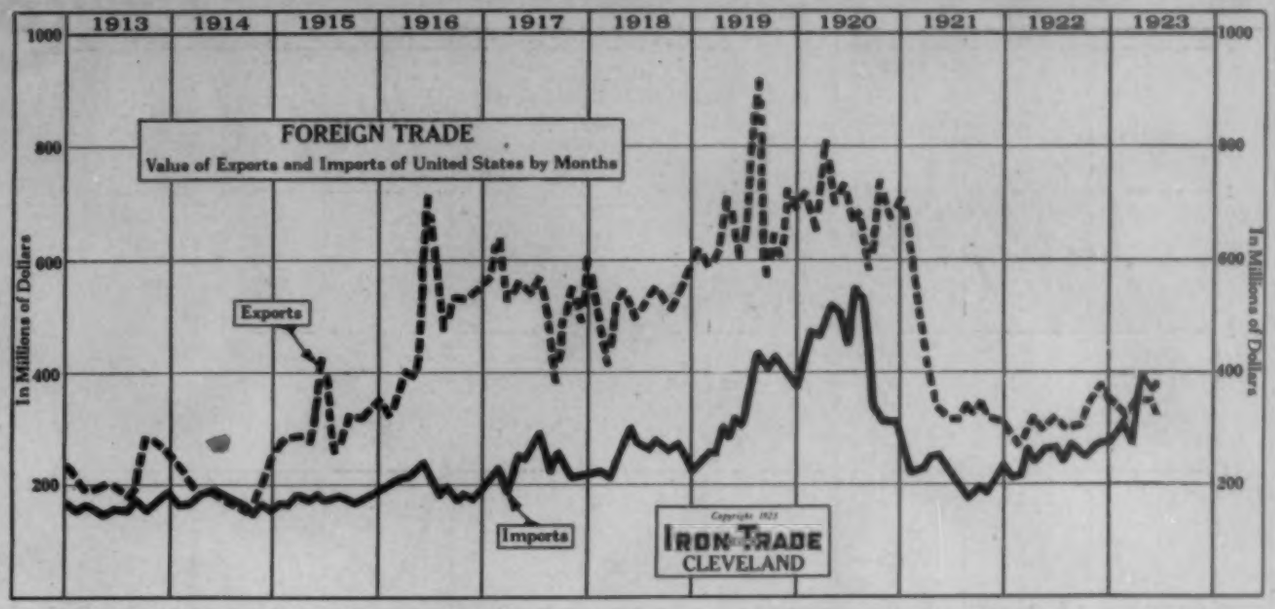
CLEVELAND

1915
1916
1917
1918
1919
1920
1921
1922
1923
150
125
100
75
50
25
Dollars
WEEKLY SECURITY PRICES
Average of 25 Railroad and 25 Industrial Stocks
25 Industrial Stocks
25 Railroad Stocks
1923
MAY
JUNE
JULY
IRON TRADE
CLEVELAND


1913
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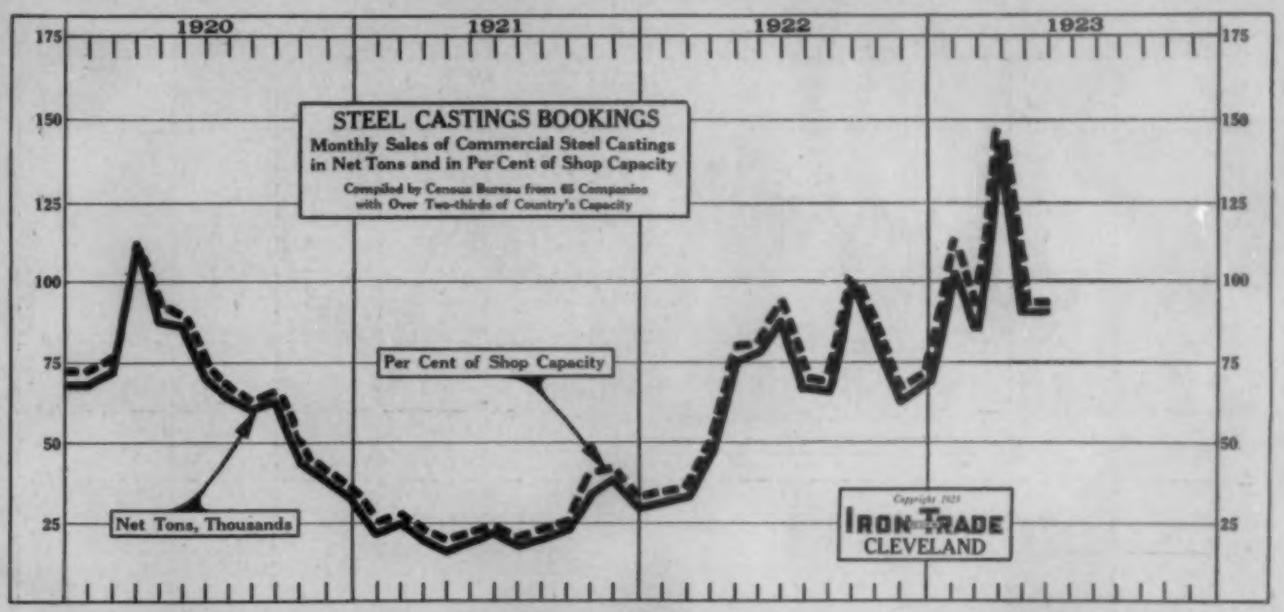
FOREIGN TRADE
Value of Exports and Imports of United States by Months
In Millions of Dollars
Exports
Imports
IRON TRADE
CLEVELAND


1920
1921
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175
150
125
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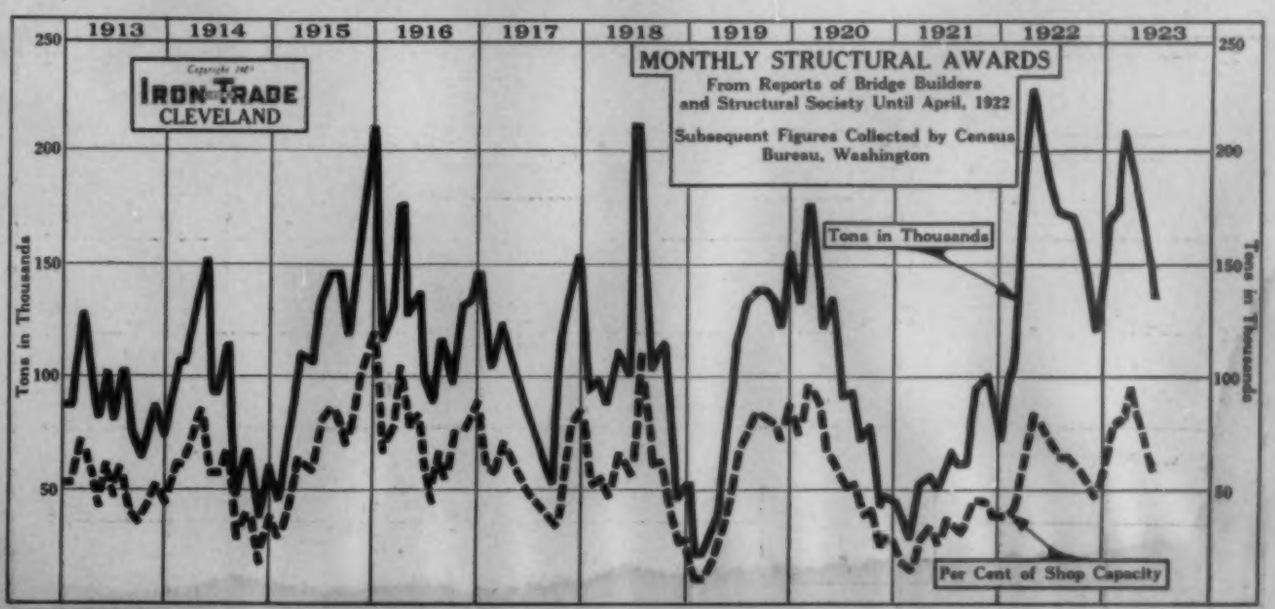
75
50
25
STEEL CASTINGS BOOKINGS
Monthly Sales of Commercial Steel Castings
in Net Tons and in Per Cent of Shop Capacity
Compiled by Census Bureau from 65 Companies
with Over Two-thirds of Country's Capacity
Per Cent of Shop Capacity
Net Tons, Thousands
IRON TRADE
CLEVELAND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IRON TRADE
CLEVELAND
MONTHLY STRUCTURAL AWARDS
From Reports of Bridge Builders
and Structural Society Until April, 1922
Subsequent Figures Collected by Census
Bureau, Washington
Tons in Thousands
Tons in Thousands
Per Cent of Shop Capacity

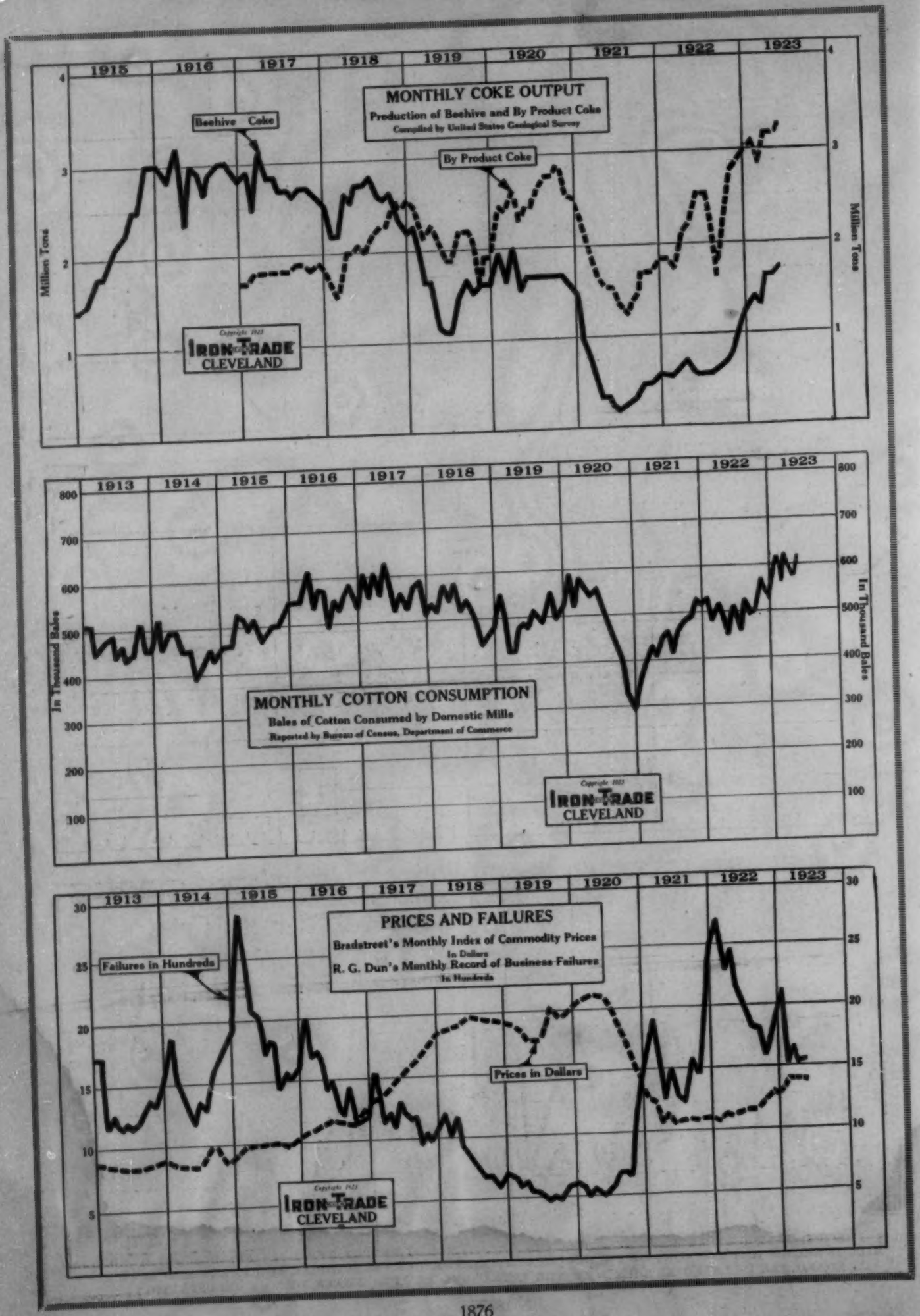

MONTHLY COKE OUTPUT
Production of Beehive and By Product Coke
Compiled by United States Geological Survey
Beehive Coke
By Product Coke
Million Tons
1915 1916 1917 1918 1919 1920 1921 1922 1923
IRON TRADE
CLEVELAND
MONTHLY COTTON CONSUMPTION
Bales of Cotton Consumed by Domestic Mills
Reported by Bureau of Census, Department of Commerce
In Thousand Bales
1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923
IRON TRADE
CLEVELAND
PRICES AND FAILURES
Bradstreet's Monthly Index of Commodity Prices
In Dollars
R. G. Dun's Monthly Record of Business Failures
In Hundreds
Failures in Hundreds
Prices in Dollars
1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923
IRON TRADE
CLEVELAND

Fig. 1—This view shows the main building of the new Weldless Tube Co., Wooster, O. The arrangement of windows provides unusual light and ventilation. At the extreme left is shown the billet yard and crane which serves it, and at the extreme right the pickle house

Mill Produces Small Size Tubes

New Plant of Weldless Tube Co., Recently Placed in Operation, Makes Seamless Tubing of 3½-Inch Diameter and Smaller—Equipment Was Specially Designed To Speed Up Production—Forming Department Provided

BY E. F. ROSS

MANUFACTURE of seamless steel tubing in the United States has increased rapidly during the last 20 years, the growth being due largely to the continuous expansion of the automobile industry. This together with a growing utilization of tubes by the engineering trades has resulted in a demand for mechanical tubing of small diameters and exacting specifications that warranted the design and construction of a mill especially adapted to meet those requirements. With that purpose in mind the Weldless Tube Co., of Wooster, O., was organized shortly over one year ago to manufacture seamless tubing. The equipment which was installed in the new plant was specially designed to produce within less than usual commercial tolerances hot finished mechanical tubes from 3½ to 1½ inches outside diameter with wall thicknesses ranging from ½ inch to 18 gage.

From the time the construction work started until the first tube was rolled was a period of 10 days over eight months. Ground was broken on July 10, 1922 and production started on March 19, 1923. During this period much of the machinery, particularly the tube making equipment, was specially designed and built. A 114-acre tract of land two miles south of Wooster was selected as the site for the mill. This location afforded direct connection to the Pennsylvania and Baltimore & Ohio

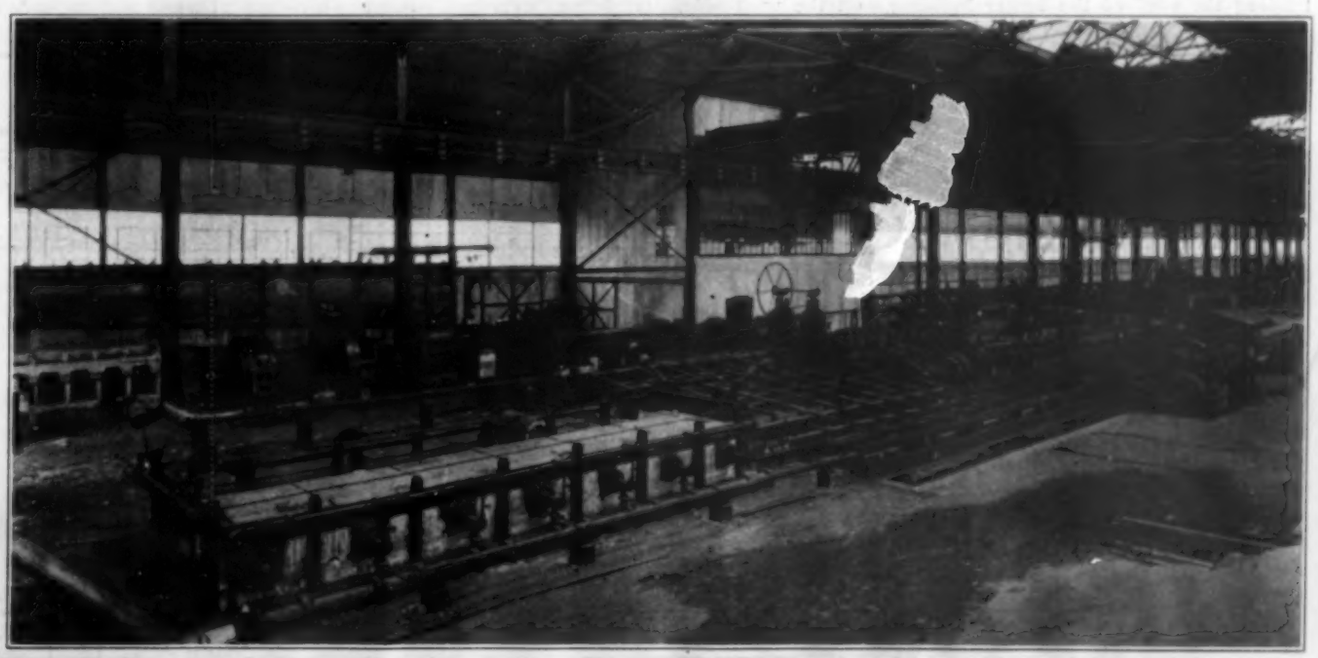


FIG. 2—THE HOT FINISH DEPARTMENT OCCUPIES THE ENTIRE NORTH END OF THE MAIN BUILDING. THE PIERCING MILL IS SHOWN JUST IN FRONT OF THE BILLET HEATING FURNACE. ELECTRICAL EQUIPMENT AND SWITCHBOARD ARE ISOLATED AS SHOWN BY THE ENCLOSURE IN THE CENTER OF THE ILLUSTRATION

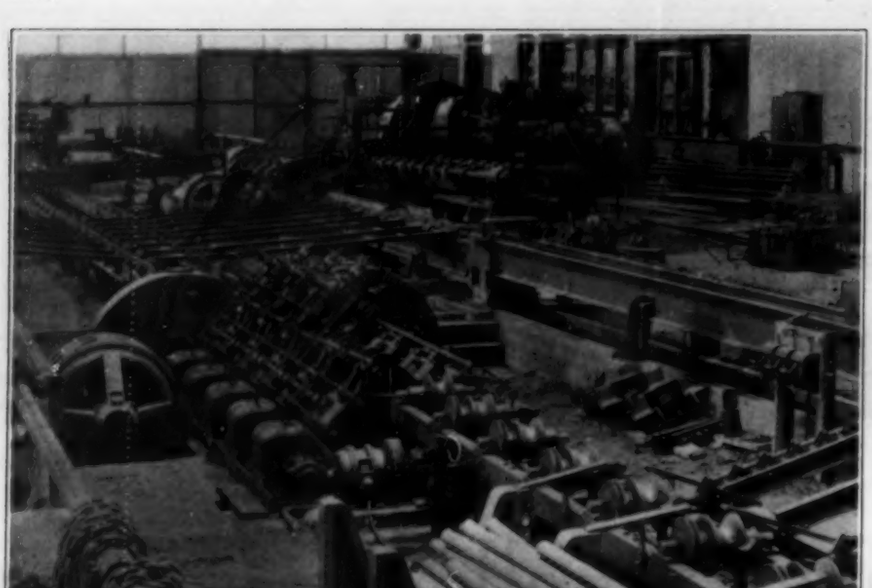


FIG. 3—AFTER REHEATING, THE TUBES ARE PASSED THROUGH THE REDUCING MILL SHOWN IN THE CENTER OF ILLUSTRATION. WHEN DESIRED THIS MILL MAY BE USED AS A SIZING MILL

railroads and the siding which was constructed along the west side of the plant serves both the receiving yard and the shipping floor. The western boundary of the site is Killbuck creek, a small stream which provides water supply and drainage facilities.

The principal building is 500 feet long and is 110 feet wide and is divided into two bays. The main bay at the west is 85 feet wide and is served by two 5-ton overhead electric traveling cranes. The smaller bay at the east of the main bay is 25 feet wide and was provided by extending the roof of the larger building down over it. Construction is of structural steel framework covered with galvanized sheet walls and roof. Ample daylight is afforded by a double row of windows on both sides of the building near the top and another row about 10 feet from the ground and running completely around the mill. As shown in Fig. 1 the windows around the top of the building may be tilted to facilitate the carrying away of smoke and heat.

At the north end of the mill building is a billet yard 60 feet wide and 150 feet long into which the railroad siding runs on the west side. A 5-ton overhead traveling crane operating on a structural steel runway which overhangs the railroad siding provides the means for unloading incoming stock and moving it about the yard. The pickle house is 45 feet wide and 110 feet long and is a separate building located in line with and 150 feet from the south end of the main mill building. The space between the two buildings is sufficient to permit another unit of cold drawing benches to be built to the end of the mill building. At the same time the housing of the pickling department in a separate building prevents the pickling acid fumes from permeating the atmosphere in the main building. Two narrow gage industrial tracks connect the two buildings.

Wood Construction Is Used

The pickle house, shown in Fig. 7, is of wood construction with a steel crane runway extending across the full width of the building and on which operates a 5-ton overhead electric traveling crane. The building is unusually high and is well provided with windows and roof ventilators to carry away the acid fumes. Even the roof trusses of the building are of heavy wood beams, as steel members would have been susceptible to corrosion. The trusses are bolted together with unusually heavy bolts placed in such a manner that should the nuts corrode away, the function of the bolts will be unimpaired and they still will serve their purpose.

Two small buildings built by the Truscon Steel Co., Youngstown, O., directly adjoin the pickle house; one houses the two car-type annealing furnaces which are charged and unloaded

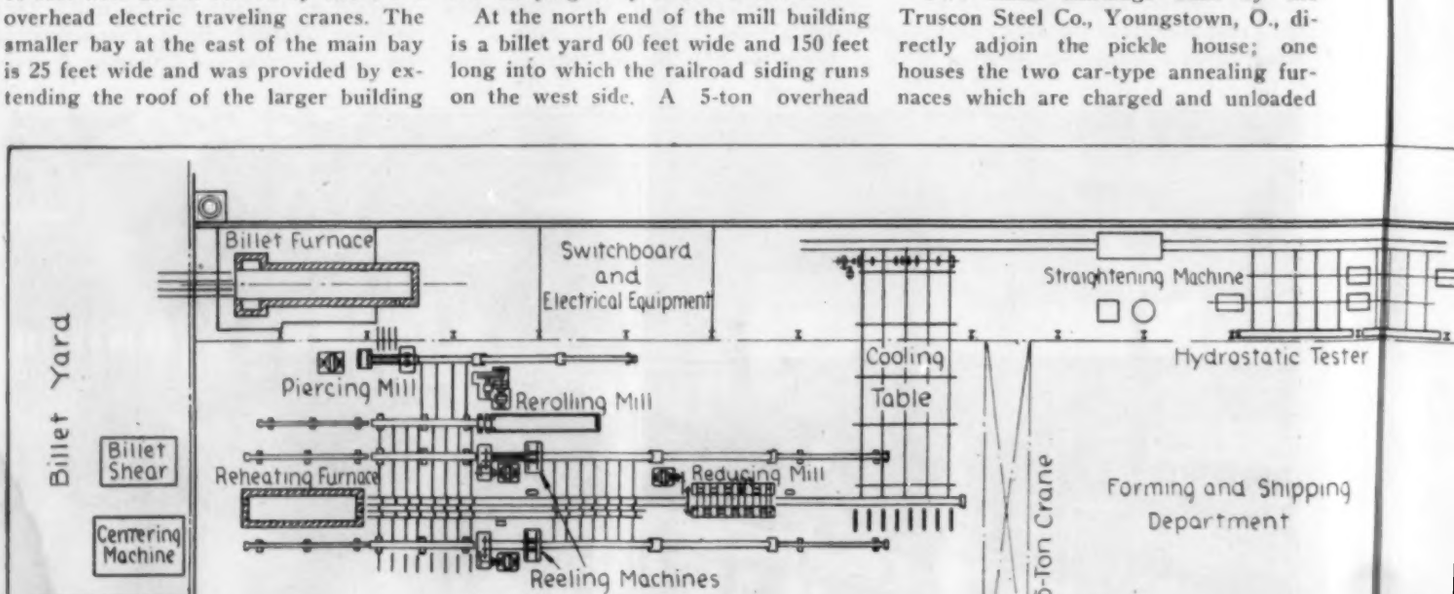


FIG. 4—LAYOUT OF THE TUBE MILL SHOWING THE BILLET YARD AND PICKLE HOUSE AND THE LOCATION OF IMPORTANT EQUIPMENT PLETELY ALONG THE SIDE OF

in the east end of the pickle house while the other houses the steam boiler which supplies steam for heating and agitating the pickling solution. Space also is provided in the boiler house for preparation of the "dope" or lubricant into which the tubes are dipped before they are passed through the cold draw benches. This lubricating material is kept in one of the six pickling tanks. Just west of the boiler house and directly in rear of the pickle house are three horizontal cylindrical tanks for pickling acid storage. The water supply for the mill, principally for cooling purposes, is obtained from a well on the west side of the main building. A small pumphouse nearby pumps the water into a large storage tank directly overhead.

Furnaces Burn Natural Gas

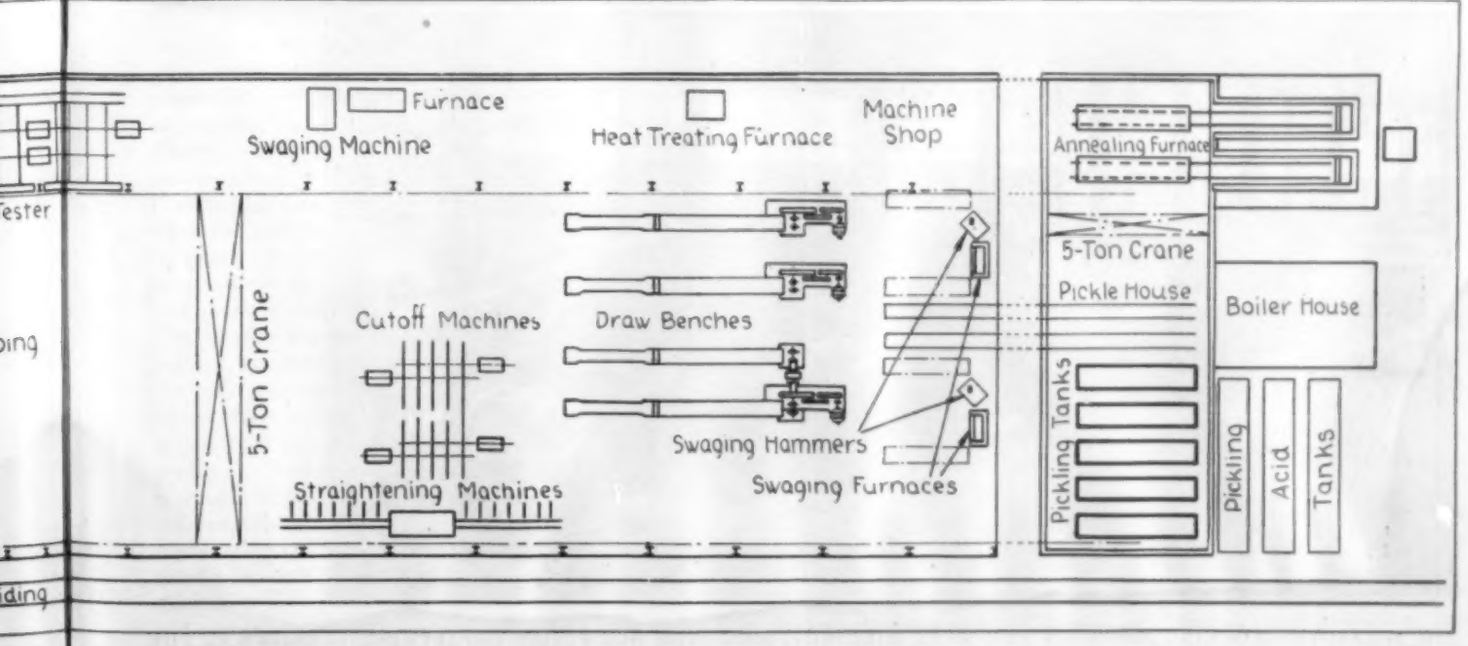
Electric power for operating the mills, cranes and other equipment, is purchased from a municipal source and is delivered to the plant at 22,000 volts. By means of a bank of transformers it is stepped down to 2200 volts for power purposes and 220 volts for lighting purposes. Natural gas is used throughout the mill for billet heating, intermediate reheating, annealing, pointing and swaging furnaces. This fuel is easily and economically handled and controlled and has been an important factor in the successful operation of the plant, as in the making and treating of seamless tubes much depends upon having the steel at the proper heat during working. The company is in the Wooster oil field and natural gas supplies for the furnaces are obtained from the company's own well located not far away.

A general layout of the mill and the equipment is shown in Fig. 4. The plant has been so arranged that once material has started from the billet yard it moves with little interruption through its successive operations. The entire north end of the mill is taken up by the hot finish department, the center of the mill is equipped as a forming department for hot and cold swaging of mechanical tubing, while the south end of the mill is devoted to the cold finish department. A general view of the mill is shown in Fig. 6.

FIG. 5—MUCH OF THE COMPANY'S PRODUCT IS FORMED BEFORE SHIPMENT. THIS ILLUSTRATION SHOWS THE FURNACE AND MACHINES FOR SWAGING AXLE HOUSING TUBES

Material is received in the billet yard in lengths of about 30 feet and in diameters ranging from 2¾ to 3½ inches in diameter. An electrically driven cold shear cuts this stock into short lengths for piercing. Before being heated these billets are placed in a centering machine which drills a hole of ¾-inch diameter and about ¾-inch deep in one end. This center or hole allows the piercer point to be further advanced in the piercing mill with the result that the piercing operation is performed with greater ease.

The billet heating furnace is located in the extreme corner of the plant, as shown in Fig. 2, and is elevated some-



EQUIPMENT. EXCELLENT RECEIVING AND SHIPPING FACILITIES ARE PROVIDED BY THE SWITCH WHICH EXTENDS COM-
IDE OF THE PLANT

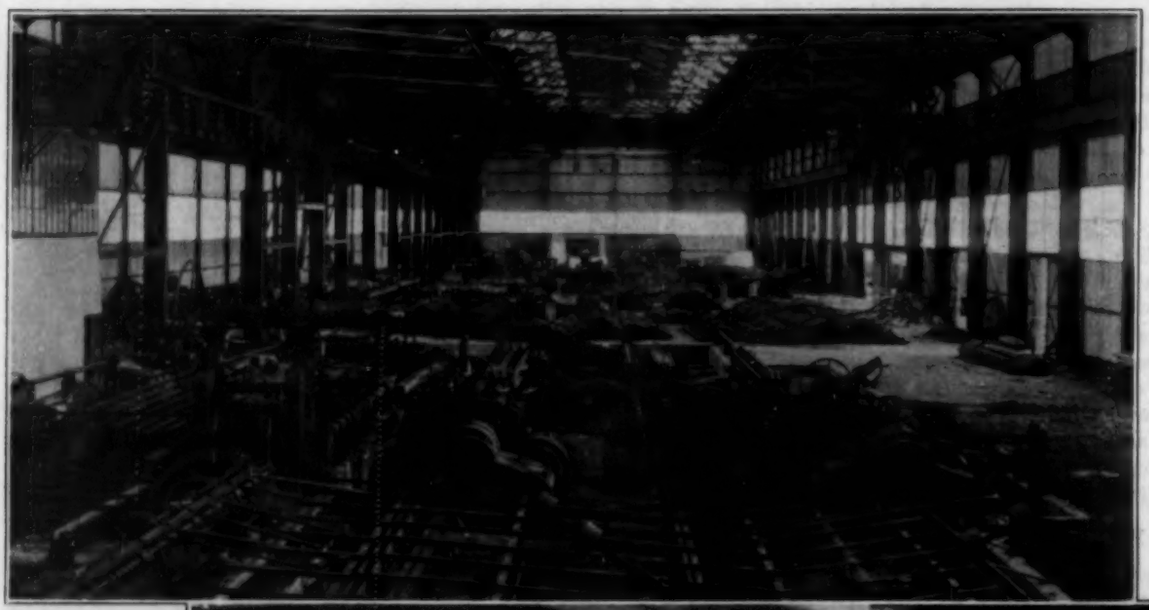


FIG. 6—(ABOVE)—LOOKING THROUGH THE MAIN MILL BUILDING. THE HOT FINISH DEPARTMENT IS SHOWN IN THE FOREGROUND, COLD FINISH DEPARTMENT IN THE BACKGROUND AND FORMING AND SHIPPING DEPARTMENT IN THE CENTER. FIG. 7 (CENTER)—INTERIOR OF PICKLE HOUSE SHOWING ANNEALING FURNACES AND PICKLE TANKS. FIG. 8 (BELOW)—DRAW BENCHES IN COLD FINISH DEPARTMENT

what above the general mill floor level. The hearth, which is 7 feet wide and 40 feet long is inclined slightly downward from the charging platform to the furnace door, thus as one billet is removed for passing through the piercing mill, a new billet rolls into position. Thus the furnace functions in a continuous fashion. The charging platform for the furnace is in the billet yard as well as a platform scale for weighing the billets.

In addition to the billet heating furnace, the hot mill unit consists of the piercing mill, rolling mill, two reelers, a reheating furnace, the reducing mill and cooling table. This equipment is shown in Fig. 2. A straightener, cut-offs and test benches follow in the line of equipment for the making of the hot finished product. All of these units are connected by skids and conveyors. As a matter of fact, the arrangement of the units is according to the usual hot mill layout, with the exception that a number of noteworthy features in design have been incorporated. One of the most important features of the layout is that hot finished tubes can be made and finished without handling by a crane until after making the hydrostatic test.

Mill is of New Type

As stated before, the mill was designed to produce 3½-inch tubes, the idea being kept in mind to produce on this mill that size and smaller only with a minimum of labor and at high speed. The unit operates at a speed considerably above that used in ordinary practice. One reason for the increased speed is that the mill is designed for the size tubes it is to produce and is not a large mill making small tubes. Another important feature of the mill, and one which makes greater speed obtainable, is the quick adjustment of angle made possible on the piercing mill rolls. This adjustment can be made at any time within 5 to 10 minutes. Formerly this adjustment has required half a day or longer. This and other features are patented.

With this angle adjustable, depending upon the wall thickness of the tubing to be made, the mill is kept up to its capacity, little time and production being lost through the changing of the angle. The piercer point is long and quite pointed and can be kept well forward in the rolls since the billet has been centered as described earlier in this article. A point of this shape also lends itself readily to reclaiming by forging. The pierced billet forms a remarkably smooth tube. It shows a slight spiral corrugation on the outside but it is unusually smooth and uniform in wall thickness.

Another important feature of the piercing mill is the arrangement by which the rolls may be spread rapidly and the upper guide raised to facilitate the removal of cobbles. This is accomplished by a motor mounted on top of the housing and connected to screws through a train of gears. A dial shows the spread of the rolls, which can be opened and returned to their original position in a few seconds. The same mechanism raises and lowers the upper guide. The piercing mill is driven by a 500-horsepower motor and while of sturdy construction, looks small as compared with mills of earlier design. This compactness is the result of careful design and attention to detail.

Billets after they have passed through the piercing mill pass over the conveyor table to the rerolling mill which is driven by a 300-horsepower motor through a special gear drive. After the required number of passes in this mill the tubes are conducted by the conveyor table to one of the two reeling machines which are driven by individual 175-horsepower motors. The tubes are rotated rapidly as they pass through the reeling machines to remove the scale and produce a slight polish. By this time the tubes have become comparatively cool, therefore, they are carried by the conveying table to a set of conveyor rolls which delivers the tube to a reheating furnace built close to the north wall and in a direct line with the reducing mill. This furnace which is shown in Fig. 2, is heated with natural gas and has a hearth 6 feet wide and 25 feet long. When a tube is sufficienty reheated it is removed by pulling it from the furnace door with a pair of tongs until the end falls on the conveyor rolls which conduct it to the reducing mill.

The reducing mill merits special attention as it is especially well designed. Particular attention has been paid to ease of alignment in setting up, to lubrication and to cooling. The mill is built to provide for 10 stands of rolls, depending upon the degree of reduction desired. However, by replacing the last roll stands with conveyor rolls, the mill may be utilized as a sizing mill. Construction of the mill is such that when a roll stand is set up on the mill floor and dropped in place on the mill by the crane, it is in complete alignment with the rest of the rolls. But a few minutes are required to replace or remove rolls, including the making of pipe connections for cooling water and lubricating oil. One of the features of the mill is that instead of placing roll stands alternately vertical and horizontal they are placed alternately at angles 45 degrees from the vertical. This, is it said, will equalize wear on bearings and will make more accurate alignment of the mill possible.

Each stand of the mill has a different gear ratio, a feature which takes care of the increase in speed in the gearing rather than in the rolls, as in the case where four stands have the same speed. Grease is forced through a cylinder by air pressure and is piped to each bearing, a turn of a stopcock lubricating a bearing at will. This same lubricating idea has been used throughout the mill. A 300-horsepower electric motor is used to drive the reducing mill, a rather clear view of which is shown in Fig. 3.

All transfer and conveyor tables are operated by compressed air as are the plungers carrying the mandrels on which the tubes are rolled. The conveyor rolls are driven by wire rope cables which in turn are driven by electric motors.

The tubes as they come from the reducing mill are placed on an inclined cooling bed which is operated by an electric motor. Upon reaching the top of the cooling bed the tubes fall upon conveyor rolls and are conducted to the straightening machine made by the Abramsen Engineering Co., Pittsburgh and located along the east wall. This machine is a departure from the usual cross roll straightener in small mills in that it is of the 12-roll type with the axis of the rolls at right angles to the axis of the tube. The first four and last four rolls are in a vertical plane and the middle four rolls are in a horizontal plane. If boiler tubes are being made the tubes pass to the cut-off machine and then to the double hydrostatic testing machine where they are subjected to the standard test of 1000 pounds per square inch. At this point the traveling crane is called into use to place the finished tubes in stock or on the shipping floor.

Preparation for Cold Drawing

When mechanical tubing is being produced, the tubes may be taken direct from the reducing mill to the south end of the main building where are located two small gas heating furnaces and two small electric power hammers manufactured by the Nazel Engineering & Machine Works, Philadelphia. Here the ends of the tubes are heated and hammered down to a blunt point to afford a grip for the drawbenches. The tubes now are ready to be pickled and annealed and are placed on one of the small cars and pushed into the pickle house.

The pickling operation consists of immersing the tubes in one of the vats containing the pickling acid, the electric crane being used in this operation. When the mill scale has been removed the crane immerses the tubes in another tank containing clear water. The tubes are then lifted out and placed on one of the two cars which roll into the annealing furnace. Fig. 7 shows the annealing furnace and the means of charging and unloading the furnace. A long I-beam is attached to each car and extends out through a

special bearing in front of the furnace. To unload the furnace, a chain is hooked into a hole in the middle of the I-beam, is passed along the channel of the beam, under the pulley shown and up to the hook on the electric crane. As the crane pulls on the chain, the car is pulled from the furnace. To charge the car into the furnace, the chain is passed on the other side of the pulley and the end hooked to the extreme end of the I-beam. Natural gas is the fuel used to heat the furnace. After annealing the tubes are removed from the furnace and allowed to cool. Following this they are dipped in the "dope" tank, placed on a small car and moved back to the main plant.

Practically the entire south end of the main mill building is devoted to cold finish work. The main equipment consists of four drawbenches, a duplicate of the straightening machine described in connection with the hot mill unit, a cross roll straightener, and a shipping scale, in addition to the two pointing furnaces and hammers, mentioned before. The two drawbenches which have their drives connected together, as shown in Fig. 8 have a pull of 25,000 pounds per square inch, while the other two have a capacity of 50,000 pounds per square inch. All drives are by electric motors.

The cold drawing operation consists of drawing the annealed tubes through dies mounted on the drawbench. The pointed end of the tube is passed through the die and gripped by jaws of a special vice mounted on wheels and so constructed that it may be attached to a traveling chain in the center of the bench. In this way the tubes are pulled through the die and given the desired reduction.

A completely equipped forming department occupies the center portion of the mill building. The equipment consists of a battery of cut-off machines as well as machinery for hot and cold swaging of mechanical tubing. At the present time a considerable portion of the company's business is in mechanical tubing and formed products for the automotive trade, axle housing tubes being one of the important items. The normal capacity of the plant is about 1500 tons per month of hot rolled, cold drawn and formed products within the sizes specified earlier in this article.

While the electrical equipment in the mill is standard, the arrangement of the control apparatus deserves special mention. As shown in Figs. 2 and 6, a small room on the east side of the mill and directly opposite the rerolling mill has been closed off from the rest of the plant. A complete switchboard is placed on a balcony across the front of this room and about 10 feet above the general mill floor level. Large glass windows in front of the switchboard as well as at each end afford the switchboard operator a complete view of the mill. Although the piercing mill, rerolling mill, reelers, reducing mill, etc., have individual control apparatus located at the mill, the main switches and indicating meters are placed on the switchboard. Thus it is always possible for the operator to keep an accurate record of the power consumption of each machine. The oil switches are placed on the main floor level and directly underneath the switchboard. In the rear of the switches is a synchronous condenser, installed for the purpose of improving the power factor, and an air compressor which supplies air for operating the transfer tables.

All of the mill equipment was designed by the Mackintosh-Hemphill Co., Pittsburgh, and built at the Woodard plant of the company at Wooster. The electrical equipment was installed by the General Electric Co., Schenectady, N. Y., and the cranes were built by the Alliance Machine Co., Alliance, O. Buell, Scheib, Mueller Inc., consulting and combustion engineers, Pittsburgh, handled the design and installation of the furnace equipment. The buildings were fabricated and erected by the Massilon Bridge & Structural Co., Massilon, O.

Offices of the company are maintained at the mill, a residence located a feet north of the billet yard having been remodeled to suit business needs. The company, which is incorported under the laws of Ohio, has the following officers: President, L. A. Woodard; vice president, John C. Schultz; secretary and treasurer, O. H. Larwill; and general manager, R. E. Brock.

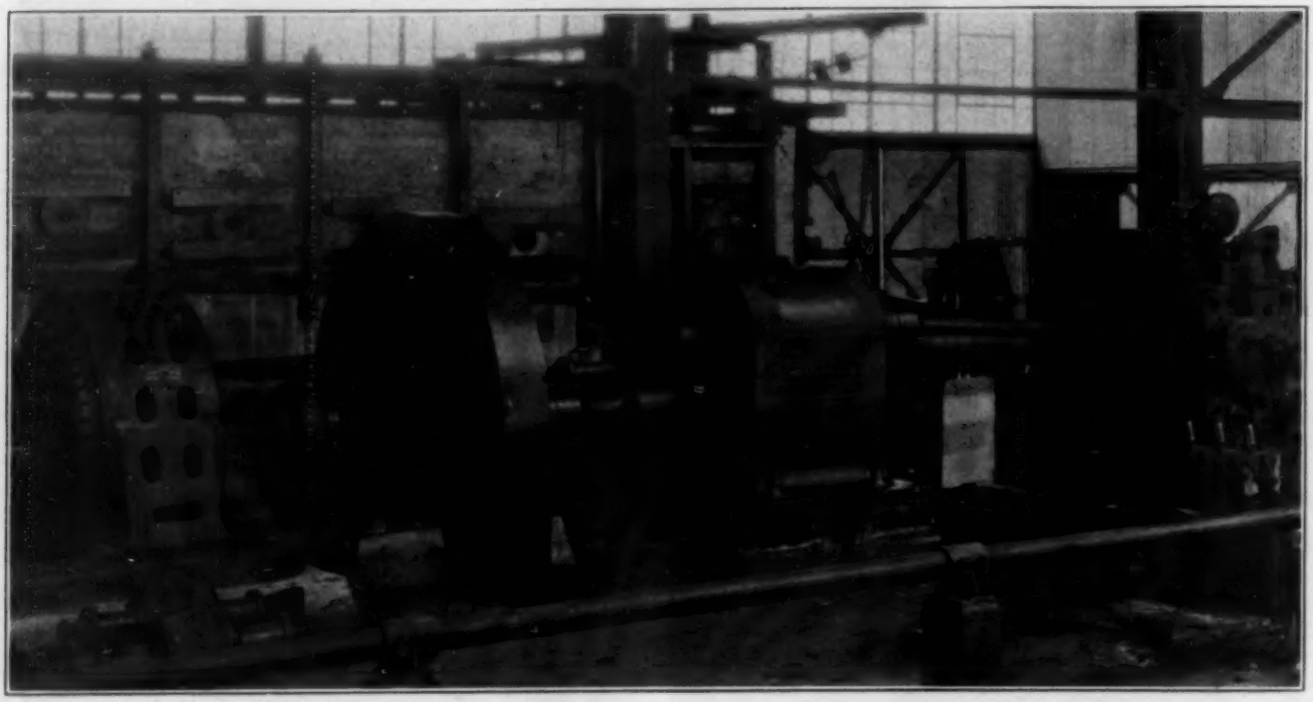


FIG. 9—A CLOSE-UP VIEW OF THE PIERCING MILL. ONE OF THE FEATURES OF THIS EQUIPMENT IS THE QUICK ADJUSTMENT OF ANGLE POSSIBLE ON THE ROLLS

Alloying Elements Affect Steel

Discovery That Additions of Metallic Elements Influence Thermal Changes and Produce Different Results Accidental—Scientific Basis for Determining Relative Influence of These Elements to Physical Properties Is Necessary

BY B. D. SAKLATWALLA

STEEL at the ordinary temperature is a heterogeneous conglomerate of various crystalline constituents cemented together by the intervention, between the crystal faces, of a medium existing in an indefinitely known physical state. The composition, physical and relative proportions of these constituents are governed not only by their chemistry, but also by the thermal life history of the metal. The different phases in the main are made up of metallic, or ferritic, and a carbide, or cementitic constituent. Owing to this heterogeneity, it is apparent that the physical forces, not only those at play in the individual components, but also those existing between the phases, will be of greater importance from an engineering standpoint than the chemical composition. Undoubtedly through change in the chemical constitution of the components the physical changes are brought about.

If to the ordinary constituents, consisting of metallic iron and an iron carbide, other elements are added, changes in the physical relations of these constituents will take place. The influences exerted by these elements constitute the metallurgy of alloy steels. The purpose of this paper is to survey such influences on the physical relations of the constituents, and to direct attention to their study from a physicochemical standpoint, devoting special attention to the period immediately preceding solidification of the steel, an interval in its life history hitherto rather neglected.

Discovery Was Accidental

The remarkable properties conferred by carbon upon iron, making it steel, are due to the physicochemical interactions between iron carbide and iron. A wide range of physical properties suitable for particular engineering problems are obtainable from the same chemical composition of the metal by merely varying the physical heat treatment. A plain carbon steel can be made exceedingly brittle and glass hard by quenching in cold water from a high temperature, or made ductile and malleable by allowing it to cool gradually from the same temperature. The discovery that additions of other metallic elements influence these changes and produce different results has been more or less of an accidental nature, and the development of alloy steel metallurgy has been more or less empirical.

The constantly increasing number of alloy steels introduced in commerce makes it opportune to establish some scientific basis for the relative influence of the several elements depending on some equivalance in physical properties among them. Undoubtedly some such equivalence of the elements exists, as several chemically different alloys can be made to produce steels of more or less similar physical properties under a divergence of heat treatment. To investigate systematically the influence of these elements on the properties of the steel components, it seems logical to start such study at a period prior to the solidification of the metal. The physicochemical activity of the constituents, and the change suffered by the addition of alloying elements, will be more pronounced and less influenced by extraneous physical conditions in the liquid, or during the solidifying, rather than in the final solid state. It will not be an exaggeration to assert that such a study of the inherent influence of alloying elements has been neglected greatly.

The splendid work of Bakhuis Roozeboom, Williard Gibbs, and others, has given us an insight into the phenomena of solidification from the standpoint of thermodynamics and chemical constitution. We have applied these principles to the study of steels, and have been able to chart the solidifying phenomena and establish thermal analysis. We are thus in position to picture the constitution of the components in steel and further verify our picture by the aid of the microscope. It does not appear sufficient, however, to know the presence of these constituents and their chemical nature without being able to correlate scientifically their chemical composition to their physical properties, and the changes occurring during their solidification to the engineering properties of the solidified steel.

The inherent physical effects of chemical elements undoubtedly start in the liquid stage, and, as the physical properties of the liquid from which crystallization takes place determine to a great extent the properties of the crystallized solid, the influence of the alloying elements should be studied in relation to the physical changes occurring prior to or during solidification. While undoubtedly, by the proper thermal treatment, much can be achieved in solid steel, yet it will be right to assert that the inherent characteristics of the steel are defined up to solidification in the ingot stage, and that all later thermal manipulations are of secondary importance.

Solidification Occurs Selectively

Solidification in a metallic alloy such as steel occurs selectively during an interval, the crystal growth starting from several nuclei in the melt. According to Quincke, a separation of the melt in two liquid phases takes place, the one in a much smaller quantity, the "oily" phase, forming cell walls for the other, the whole forming a "foam structure" with several points or nuclei for crystal growth. The application of X-ray analysis to crystal structure has shown us that the atoms of the crystals are arranged in definite characteristic space lattices in contra distinction to an indefinite arrangement in a liquid.

Among the immeasurably large number of atoms of the liquid melt there will be some which will have an arrangement corresponding to the space lattice arrangement of the solid crystals, or closely approaching it. We can readily see that such atoms will selectively assume the solid state ahead of the others, and hence act as nuclei for crystal growth. Solidification from these nuclei will proceed, at the same time continuously diminishing the quantity of the molten mother magma, until the amount of liquid, or the spaces left between the grown crystals, will be so small as not to allow further crystallization.

From a paper presented at the New York meeting of the American Electrochemical society, May 3-5. The author is general superintendent, Vanadium Corp. of America, Bridgeville, Pa.

This residual material will, therefore, fill up the capillary interstices between the crystals forming the so-called intercrystalline cement medium.

As to the exact nature of this medium there is considerable uncertainty. On account of it not following the crystallization of the first successive solidifying part of the melt, it commonly has been called amorphous. Recent observations with X-ray spectograph on the amorphous metals would lead us to assume the presence of extremely fine crystal bodies combined with colloids in this intercrystalline medium. Its remarkable properties can be explained more satisfactorily on this assumption than on that of it being amorphous. Owing to the importance of this medium from an engineering standpoint, it deserves further close study from the standpoint of colloid phenomena and X-ray analysis.

Alloys Affect Crystallization

The crystallization from nuclei and the growth of individual crystals will depend on the chemical composition of the melt, its degree of under-cooling, heat conductivity and diffusion capability of the resulting crystals, etc. In these several factors, the presence of other alloying elements in the melt will exert a great influence on the progress of crystallization. For instance, slight impurities in the melt have been found to check the velocity of crystallization. The impurity absorbs on the surface of the growing crystal, thus checking the velocity of its growth. It the absorption on the different faces of the crystal is of a different degree, the the crystallization velocity will be different in different directions, and consequently the solidified crystal can be altered completely, for instance, from a polygonal to a dendritic form. Hence we readily can see that the presence of a small amount of another element in liquid steel can influence materially the size and shape of the primary crystals and alter the structure in the solidified steel. We are all aware of the importance of the primary ingot structure in engineering practice.

Another property of growing crystals is that they eject any impurities to the surface of the crystal. The presence of another element may alter the solubility of such impurity in the crystal and consequently influence the degree of its ejection. This ejection brings such impurities present, not only to the surface of the crystal, but into the intercrystalline cementing medium. Thus, the presence of another alloying element may alter appreciably the amount of such impurity in this medium, and hence influence in a marked manner in the finished steel those physical properties which are a function of the intercrystalline medium, such as elastic and endurance limits.

Another influence of the ejection of foreign elements by growing crystals can be seen in the case of noncorrosive steel alloys. It appears remarkable that the noncorrosiveness is brought about when a definite sharply recognized percentage of the alloying element is present. For example, 10 to 14 per cent chrome steel may be cited. This phenomenon is probably due to the fact that the growing crystal is capable of keeping in solution a certain percentage of the element, and starts ejecting it to its surface after this saturation is reached. The surface of the crystal can thus have a high percentage of the element requisite to give it the necessary protection against corrosion.

Also in connection with other physical properties, we are aware that the percentage of the alloying element has to be beyond a certain range. As examples may be cited 3.5 per cent nickel steel and 12 per cent manganese steel. The influence of these percentages probably can be explained similarly on the basis of ejection of these elements to the surface by the growing crystals thus altering their surface properties of adhesion, etc., also introducing a necessary amount into the intercrystalline cement, altering its properties. From this standpoint it also is apparent why the presence of nonmetallics in the fluid steel exerts such dastardly pernicious effect on the physical properties of the solidified metal. They not only influence the process of crystallization, but through ejection get disseminated in the vital constituents of the steel.

Surface Tension Important

Whether we agree with Quincke on the separation of two liquid phases prior to solidification, or believe in crystallization growing from the nuclei only, it is easy to see that the surface tension, with its dependent properties, of the molten magma will be of extremely great importance. Considerable work has been done on measurements of surface tension of liquid metals by several different methods. It also has been assumed, since the property of surface tension of a liquid depends so intimately on the cohesion of the molecules, and since the properties of liquids and solids show signs of continuity in the two phases, that some relation exists between the surface tension of the fluid metal and cohesion and tenacity in the solidified state.

If the elements are arranged as a function of atomic weight to atomic volume, or of atomic number to atomic volume, they form a series of connected curves, each one representing a group of elements and consisting of an ascending and descending branch. The properties of the elements so arranged seem to bear marked relation to their neighbors on the same curve. For instance, the melting points, hardness, ductility and brittleness, electronic properties, surface tension, seem to be co-ordinated by these curves. It appears from this that the atomic volume, as an inherent characteristic of the atom, more than any other property is of paramount importance. It undoubtedly is the criterion of the physical qualifications of material.

Theory of Atomic Volume

In light of present knowledge of the structure of the atom we can see that the atomic volume will be made up, not only of the masses of the electronic constituents, but also the intraelectronic spaces and the intra-atomic spaces. The action between atoms is known to be dependent on their relative arrangements in space lattices, and as these are brought about by forces acting over intra-atomic spaces we readily can see why the atomic volume should be a criterion of these changes. In the arrangement, according to atomic volume, it is remarkable that the steel alloying elements group themselves close together. Attempts at generalization among these elements have been made, such as the theory put forward by Osmond that elements with greater atomic volumes than that of iron tend to raise and those with atomic volumes less than that of iron tend to lower the transformation points, Ar_3, Ar_2 and Ar_1. Also the elements producing marked effects in steel possess high melting points, a characteristic also dependent on atomic volume.

In practical application of these considerations extreme caution should be used as the formation and presence of definitely formed chemical molecules in place of the individual atoms introduce a new phase in the chemicophysical equilibrium. In such cases we are confronted not with atomic but with molecular volumes, and the effect exerted by the addition of the element is that of the compound formed and not the element itself.

In the absence of definite theoretical knowledge from a physicochemical standpoint, we are obliged to judge the merits of alloying elements from the results achieved by them. Undoubtedly the use of alloying elements has advanced wonderfully our engineering practice in steel construction. The role of these elements has sometimes been minimized with the argu-

(*Concluded on Page 1892*)

Furnace Plant Is Made Modern

Erection of New Ore and Coke Bins and Trestle System by the Adrian Furnace Co., Accomplishes an 84 Per Cent Reduction in Stock House Labor— Traveling Coal Bridge Used for Ore

ANTICIPATING the labor difficulties which many iron and steel producing plants are experiencing at present, the Adrian Furnace Co., Du Bois, Pa., last year decided to install at its blast furnace a modern permanent storage bin and trestle system, together with scale cars, transfer car, and other necessary auxiliary equipment. After remodeling, the furnace was placed in operation on April 6, 1923, and with the new mechanical handling equipment, it has been possible to reduce the number of men employed in the stock house from 19 to three per shift.

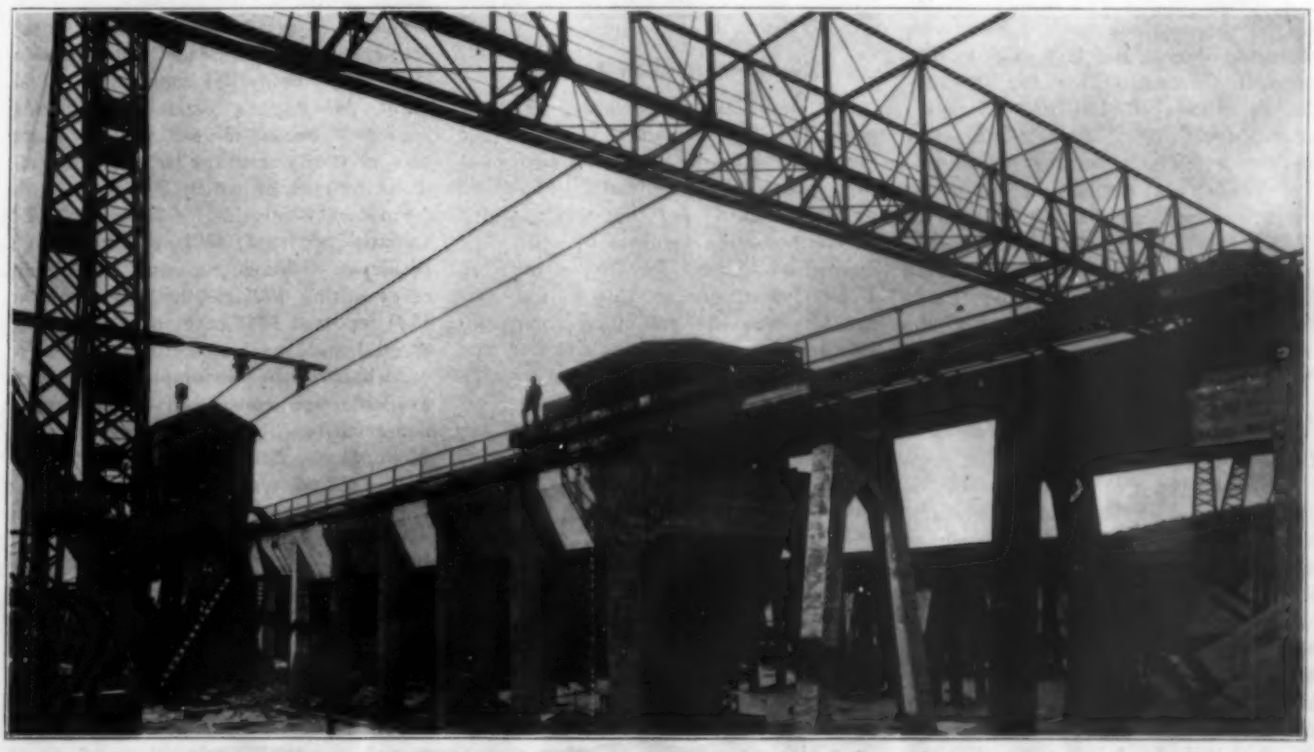
When the furnace was last blown out, in August, 1922, it was decided to begin the improvement program at once. Arthur G. McKee & Co., Cleveland, were selected as engineers and contractors and were awarded a lump sum contract for the entire work. In selecting a location for ore storage, decision was made to utilize a site adjoining the property of the Rochester & Pittsburgh Coal & Iron Co., which company also controls the Adrian Furnace Co. property. This plan made it possible to bring into service a traveling bridge which was originally installed by the Rochester & Pittsburgh Coal & Iron Co., for handling and storing coal. By providing a slight curve and extending the crane runway, the bridge can now traverse the ore storage and serve the transfer car operated in connection with the new trestle and bin system. It was necessary also to change the center line of the new concrete trestle to a point 3 feet 6 inches from the center line of the old wooden trestle, which was practically completely dismantled.

Trestle Is of Concrete

As shown in the accompanying illustration, the new bin and trestle structure, comprising a total of 33 bents, is 480 feet in length and is of steel and reinforced concrete construction. The height of the trestle at the skip pit is 27 feet to the top of the rail, and is provided with walkways on each side of the trestle tracks with a steel handrailing. Suspended from the reinforced concrete supporting structure are six ore and stone bins, each 5 feet in length. The bins are of the Baker suspension type and of ⅜-inch steel plate construction, braced and reinforced with angles and beams. For direct discharge into the scale car, the bins are equipped with a continuous row of segmental type gates, which are easily operated from the scale car platform. The scale car for carrying ore and stone from the bins to the skip pit is electrically operated and is of heavy steel construction. The car is of the center discharge type with side platform, the control and scale equipment, car discharge and bin discharge mechanism being so arranged that they are all easily accessible to the scale car operator. To accommodate the new arrangement it was necessary to deepen and enlarge the existing skip pit, and to extend the travel of the skip cars.

The coke bin is of the central discharge type, is 45 feet in length, and occupies three bays in the trestle structure. The bin sides and bottom are of ⅜-inch steel plate and braced with structural steel members. Wearing plates are provided in the lower portion of the bin. The coke bin is designed for a capacity of 135 tons of coke when level full.

For screening the coke, two McKee-type cascade coke screens were provided,



NEW CONCRETE TRESTLE AND ORE BINS BUILT AT THE PLANT OF THE ADRIAN FURNACE CO., DUBOIS, PA. THIS VIEW SHOWS THE COAL BRIDGE WHICH WAS CONVERTED TO AN ORE BRIDGE, THE NEW TRANSFER CAR AND THE OPERATOR'S HOUSE AT THE LEFT

over which the coke is discharged from the storage bin direct into the skip cars. Beneath the coke screens are two chutes which deliver the breeze to the boot of a bucket elevator. The breeze is then elevated approximately 30 feet and emptied on a 14-inch belt conveyor, which carries the material approximately 52 feet and discharges direct into railroad cars. The belt conveyor is of standard construction, provided with four-ply rubber covered belt, troughing idlers and return idlers. Power for driving is supplied by an electric motor.

Prior to the installation of the new handling equipment, operation of the skip hoist, furnace bells, etc., was accomplished from several remote points, and to overcome this disadvantage, a new operator's house was constructed. This house is located at the skip pit on the furnace side of the coke bin. With the new arrangement the operator has under his direct control the operation of the skip cars, coke bin gates, coke breeze disposal equipment, furnace bells and all the furnace gaging mechanism.

As previously mentioned, it was decided to convert the traveling coal bridge into an ore bridge and owing to the existing construction and clearance of the bridge and bucket, a special transfer car was required for distributing materials from the ore bridge to the respective storage bins. The maximum clearance obtainable was approximately 8 feet above the top of the rail, necessitating the provision of a cab which would afford a full view of all operations and still meet the clearance requirements. For these reasons the car was designed with the cab located in a lowered position and supported by extending the car frame.

Car Is Completely Equipped

The car has an overall length of 40 feet, the hopper being 20 feet 6 inches by 12 feet 8 inches at the top, giving a capacity of 50 net tons. For discharging its contents the car hopper is equipped with two pairs of counterweighted discharge gates, so arranged as to dump the material symmetrically from the hopper. Opening and closing of the gates is effected by a mechanism of levers, cams and shafts, operated by means of air cylinders. An auxiliary hand operating mechanism was also provided, for use in case of failure of air supply. The car is equipped with two four-wheel standard 50-ton arch bar trucks with air brake equipment, and is driven by two 51-horsepower motors, one mounted on the axle of each truck. All auxiliaries, such as fenders, headlights, warning gongs, etc., are included in the car equipment.

The new construction and equipment provides the Adrian Furnace Co. with a complete mechanical handling and storage system, which by utilizing certain existing equipment, was provided at a minimum cost. Reconstruction work was completed Feb. 9, 1923. The interests of the Adrian Furnace Co., in connection with the improvement program, were handled by F. G. St. Clair, general manager.

Must Reduce Accident Hazards to Eyes

APPROXIMATELY 200,000 accidents to the eyes of workmen occur each year in industry and about 15 per cent of the total blind population of the United States or 15,000, represents the industrial blind. These are two of the facts developed in a survey of the eye hazards of industrial occupations which has been conducted during the last year by the National Committee for the Prevention of Blindness, 130 East Twenty-second street, New York. The study covering every state in the nation and every industrial occupation in which there is an accident hazard, was directed by Lewis H. Carris, formerly administrative head of the federal board for vocational education, and Louis Resnick, formerly of the staff of the National Safety council. A report of the conditions discovered during this investigation, covering more than 150 printed pages and including recommendations for the elimination of the principal causes of eye accidents, will be distributed by the national Committee for the Prevention of Blindness, among industrial executives, superintendents, foremen and safety engineers.

The introductory chapter of the survey report states that the science of human rehabilitation has developed artificial hands, arms and legs that can do almost anything the human member can do, but no one has yet produced an artificial eye that can see nor is there any hope that such an eye will ever be produced. This fact makes the eye hazard the most serious of all nonfatal industrial accident hazards. When we put aside all humanitarian reasons, however, and consider the problem purely from the economic point of view, the eye hazard in industrial occupations still ranks second only to death in seriousness.

Eye Compensation Is High

Out of $12,000,000 awarded as compenstation for permanent injuries since the inception of the workmen's compensation act in Pennsylvania, $5,000,000 or more than 40 per cent was awarded as compensation for loss of eyes. The compensation paid for loss of eyes in Pennsylvania during this period was greater than the combined compensation for loss of legs, arms and feet, and for permanent disability from miscellaneous injuries.

The report points out that much has been accomplished toward alleviation of the eye accident problem in industry by the work of such organization as the National Safety council, the Safety Institute of America, the American Society of Safety Engineers and the various state industrial commissions. But all this, the report says, is merely a beginning.

There are still countless plants whose operations present serious eye hazards, in which no goggles or other protective equipment are available. There are many plants where workmen still wear goggles in their pockets except when they are watched. There are still plants in which toothpicks, matches, handkerchiefs, pocket knives and even the tongues of workmen are the instruments employed to remove cinders and other particles from the eyes of fellow workers.

Industrial accidents, the report says, are responsible for an injury to a human eye every 2½ minutes day and night, 365 days a year. In California during a recent 5-year period, there was a yearly average of 10,470 accidents to eyes of which 206 resulted in permanent injuries. During 1922 Indiana reported 4291 industrial eye accidents. Illinois reported 1887 such cases during 1921, while New York in 1920 reported 1568 cases of eye injuries through industrial accidents.

Although the incomplete statistics available are considered in the most conservative light, according to the National Committee for the Prevenion of Blindness, they justify the estimate that several thousand human eyes are blinded forever through industrial accidents in the United States each year, and that many more thousands of persons each year suffer partial, but permanent impairment of the vision through such accidents.

The solution of this problem, the report says, depends upon three forces, namely, legislation, education and actual accident prevention service to industry. Legislation may compel indus-

try to build and maintain its shops safely and it may compel the employer to compensate workmen for injuries, but all the legislation in the world will not keep a workman from shoving his goggles up to his forehead or putting them in his pocket if that workman has not been convinced that he should wear goggles every minute of the time that he is engaged in dangerous work. Only education will do that.

The introduction to the full report says that the report itself will be predicated on a point of view which may be summarized as follows:

1. The elimination of eye hazards in industry is not only a moral obligation, but a good business proposition.
2. Goggles at best are a handicap; the first effort, therefore, should be directed toward the elimination of the hazard itself by changing the processes of manufacture, by redesigning machines and tools, or by guarding machines and tools at the source of accidents, usually the point of operation.
3. Few people have perfect vision to start with, greater attention, therefore, should be given to the examination of the eyes of employes, to the correction of the defective vision of industrial workers and to a consideration of the condition of the eyes of the individual worker with relation to the visual requirements of the work that he is to do.

Completes Trial Run on Experimental Stack

A succesful test run of the experimental blast furnace operated by the department of the interior at the North Central experiment station of the bureau of mines, Minneapolis, was concluded recently. This test run marked the culmination of four years of experimentation by the bureau of mines, in co-operation with the University of Minnesota, in the development of this blast furnace, which is unique in the field of industrial research. During the entire run every phase of operation of the furnace was under complete technical control. Several tons of commercial gray iron and of spiegeleisen were made. With this demonstration of the possibilty of operating an experimental blast furnace, with every detail of furnace operation under technical control, it is believed that the investigators now are in a favorable position to undertake the study of various problems, the solution of which should be of great practical value to blast furnace operators.

After blowing in, the furnace was operated as a slagging-type gas producer until it had reached a steady state thermally and chemically. A series of thermocouples, located at five elevations in the mantle, were used to determine the travel of the heat wave up the charge column as the cold material used in filling the furnace gradually acquired heat from the ascending gases generated by combustion at the tuyere zone.

When the top temperature indicated that the furnace had reached a steady state, iron ore, without the addition of flux, was charged and its descent in the furnace was followed by means of gas samples taken from various planes up the side of the mantle. It was found that reduction began shortly after the iron ore had been charged and was completed at a point remarkably close to the stockline. The ore used in this experiment had been sized so that the particles were a little smaller than garden peas. When the effect of this charge had been dissipated, more of the same size iron ore was charged without any limestone and another set of gas samples was taken.

The purpose of these experiments was to obtain a comparison of the gas composition at various planes of the furnace when no reduction was taking place and, when an iron ore burden had been charged. Such a comparison indicates the levels in the furnace where reduction starts and where it is completed. Without changing any of the operating details the physical character of the burden was changed to a less homogeneous ore size, with ore particles varying from pieces about 2 inches in diameter to fine ore. A black slag, indicating incomplete reduction, appeared after this burden had been charged a sufficient length of time for it to pass through the furnace. The burden on the furnace was decreased and the scouring slag disappeared. Several rounds of fine ore were charged next and the reduction at the stockline was found to be greater than when a coarser ore was used. This was indicated by higher carbon dioxide.

These examples are cited to indicate how a study was made of the effect of sizing of ore upon its reduction in the blast furnace. An iron ore burden was charged continuously for several days, approximately 3 tons of gray iron being made per day. Towards the end of the run several tons of spiegeleisen were made from manganiferous iron ore from the Cuyuna range. Gas samples were taken on this ore, as well as on the iron ore, from five elevations in the mantle during the operation.

The furnace was operated for 12 days and blown out empty and in good mechanical condition. No serious difficulty was experienced in operating the furnace. A large number of gas, slag and metal analyses are yet to be made.

Likewise, a number of temperature, pressure, and other readings are to be studied.

To Standardize Marine Equipment Sizes

The executive board of the American Marine Standard committe has set up five technical committees to work upon the simplification and standardization of marine supplies and equipment. These committees, having to do with hull details, engineering details, supplies and details for ship operation, port facilities, and manufactures and construction, will create subject committees to handle specific items. When these subject committees have made recommendations to their superior technical committees and the industry interested has commented upon the recommendation, a majority favorable vote of the executive board will give the recommendation the status of a suggested American marine practice, a two-thirds vote the status of a tentative American marine standard, and a three-fourths vote the standing of an American marine standard. The standards committee, which is working upon the direction of Secretary of Commerce Hoover, is not aiming at standardizing ships themselves but at eliminating superfluous sizes in equipment.

Arranges Study Course for Gas Welding

The American Welding society has issued an outline for a course in training on oxyacetylene welding. The course combines the experience of experts of the federal board of vocational education, the American Welding society, and the National Research council. The text includes a discussion of the qualifications which the candidates for training should possess. The course presents the fundamentals in gas welding, together with a detailed statement of contents classified under welding jobs arranged in the order of difficulty. Copies of the outline of the course may be had from the American Welding society, 29 West Thirty-ninth street, New York.

Accidents at coal mines in the United States in April took a toll of 175 lives, at the rate of 3.49 per million tons mined. The fatality rate for April, 1922 was 4.87. In the first four months of 1923 the total of fatalities has been 851 and the rate 3.96; in the same four months of 1922 fatalities numbered 671 and the rate was 4.04.

Using Air To Desulphurize Coke

Experiments Reveal Practicability of Oxidizing Ferrous Sulphide in Industrial Processes To Decrease Sulphur Content of Coke—Found Impossible To Remove All Free Sulphur Retained in an Absorbed Form

BY ALFRED R. POWELL

IN ANOTHER paper recently published, the author has described an investigation carried on by the Pittsburgh experiment station, bureau of mines, in which the forms of sulphur in coke were determined. In that investigation coke was found to contain four characteristic forms of sulphur, namely, ferrous sulphide, sulphates, adsorbed free sulphur, and sulphur held in solid solution in the carbon. While the coke remains in the oven, only two forms of sulphur are present, namely, the ferrous sulphide and the sulphur in solid solution in the carbon. During the quenching process, however, the sulphur of the coke is subjected to considerable oxidation, a portion of the ferrous sulphide being oxidized to free sulphur and sulphates, while the solid solution form remains unchanged. The coke loses no sulphur during this process, since the free sulphur which is formed is retained by the coke in an adsorbed form.

Since this oxidation of the ferrous sulphide took place so easily, another investigation was undertaken to determine the possibility of using this property advantageously in some industrial process for the desulphurization of coke. Although it is true that such a roasting process would not touch the solid solution form of sulphur, still the removal of the ferrous sulphide sulphur would undoubtedly benefit the coke from the standpoint of the metallurgist. This improvement in the coke would result not only from the decrease in total sulphur, but also from the large decrease in the ferrous sulphide, which is responsible for the contamination of the iron in the upper part of the blast furnace.

Idea Not a New One

The desulphurization of coke by roasting in air is not a new idea, as it dates back to the earliest days of coke manufacture. In 1871, Philippart published the results of work done by him on the desulphurization of coke by air as well as a review of the results of earlier investigators. In the first experiments, nothing was known of the forms in which the sulphur existed in the coke, and the temperature measurements were only approximate, so that altogether the results were neither conclusive nor complete. The desulphurization figures given by these early investigators generally showed a low efficiency for the process, but some extraordinary results were claimed by certain inventors. In the light of our new knowledge concerning the sulphur in coke, it seemed to be important enough to warrant investigation.

One of the first factors to be determined in this investigation was the optimum temperature for the oxidation of the ferrous sulphide in the coke. From general considerations it might be assumed that the higher the temperature the faster would be the oxidation of the ferrous sulphide. On the other hand, the coke itself would oxidize faster at the higher temperatures. It was necessary, therefore, to determine a mean temperature that would best satisfy both conditions.

A series of runs at different temperatures was made, in which powdered metallurgical coke was placed in a tube heated to the desired temperature, and a slow current of air passed over it. Then analysis of the residue for ferrous sulphide showed the relative coke loss at different temperatures. At 300 degress Cent. the oxidation of ferrous sulphide proceeded rather slowly, and there was no loss of coke. At 400 degrees the oxidation took place much more quickly with no appreciable loss of coke. At 500 degress Cent. the oxidation of the ferrous sulphide was complete at the end of a few minutes, and the coke loss was small, being under 1 per cent. At 600 degrees Cent. and higher a noticeable coke loss took place, and the oxidation of the ferrous sulphide was slower, if anything, than at 500 degrees Cent. since the oxygen was consumed in the combustion of the coke.

These experiments showed that 500 degrees Cent. was the best temperature for the oxidation of the ferrous sulphide, when the relative speeds of oxidation of the ferrous sulphide and the coke itself were considered. For this reason the temperature used in the treatment of the coke was 500 degrees Cent. although several runs were made at temperature as high as 650 degrees Cent. for reasons that will be described later.

The methods of analysis used for the sulphur forms in the coke both before and after the desulphurization treatment are described in another paper by the author. In brief, this examination consisted of treating one sample of the coke with hydrochloric acid, the hydrogen sulphide evolved being a measure of the ferrous sulphide in the coke. The sulphate in the coke being in this hydrochloric acid solution could be determined as such. Then, another sample of the coke was reduced by heating to a red heat in an atmosphere of hydrogen, and cooling it in the atmosphere. This reduced the sulphates to sulphides, and also the adsorbed free sulphur to ferrous sulphide. On treating this with hydrochloric acid, the hydrogen sulphide evolved would be a measure of the combined ferrous sulphide, sulphates and adsorbed free sulphur. By subtracting the ferrous sulphide and the sulphates, which were already known, the content of free adsorbed sulphur could be calculated. Then the combined ferrous sulphide, sulphate, and free sulphur subtracted from the total sulphur gave the sulphur held in solid solution in the carbon. In this manner all four of the sulphur forms could be determined. The method is quite reliable, since the results obtained by its use have been checked against other methods which have developed from the investigations into sulphur in coke, and the comparisons have been satisfactory.

Involves Two Stages

Any process designed to secure the desulphurization of coke by air must involve two stages at least. The first stage consists of the oxidation of the ferrous sulphide of the coke to form oxide and free sulphur. The optimum temperature for this has already been mentioned. Another factor, namely the pressure of the air, is important, since increased pressure tends to force the air into the pores of the coke, and therefore, to promote the oxidation.

The second stage of the process consists in the removal of the free sulphur formed in the oxidation, and which has been adsorbed on the surfaces of the coke. Three different methods for the removal of this sulphur from the coke were tried in this investigation. The first consisted in the production of a vacuum, whereby it was hoped that the sulphur would volatilize at the temperature of the coke at that point in the process, that is 500 degrees Cent. The second method tried for the removal of the sulphur was the use of a higher temperature than 500 degrees. However, whatever temperature was used in this second stage of the process had to be used in the first stage also, since it would be impracticable to permit coke to cool down from the oven temperature to 500 degrees Cent., and then to heat it up again for the second stage. For this reason, 650 degrees Cent. was about the highest point

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that the temperature could be elevated. The third method for the removal of the free sulphur from the coke consisted simply in the continued passage of the air through the coke after the primary oxidation of the ferrous sulphide, so as to roast out the retained sulphur. This latter reaction always took place to some extent since the oxidation of the free adsorbed sulphur started before the primary oxidation of the ferrous sulphide was complete.

Since the previous investigation of the sulphur in coke had indicated that adsorbed sulphur could be removed readily from the coke by the action of hydrogen at a red heat, it might be assumed that such treatment might be efficiently applied after the oxidation of the ferrous sulphide, in order to remove the adsorbed free sulphur. However, in the instance mentioned, the iron had been removed from the coke by acid extraction before the hydrogen treatment. Where the iron remained in the coke, as it would in practice, the effect of hydrogen simply reverses the effects of the roasting and reconverts the free sulphur into ferrous sulphide. Such treatment is therefore out of the question.

Must Be In Chunk Form

Since metallurgical coke must be kept in the chunk form in which it is made, all of the desulphurization tests were performed on coke which ranged from 2 to 3 inches in diameter. By doing this, results could be obtained which would be comparable to large scale practice, while tests on powdered coke would have little real meaning.

The apparatus for performing the tests consisted of a 3-inch steel tube about 2 feet long, which was wound with resistance heating wire. A thermocouple was inserted between the tube and the winding so that the temperature of the tube could be controlled. The tube was mounted on a frame in a vertical position. The lower end was closed by a cap through which a small pipe was inserted for the air inlet. The upper end was closed by a blind flange, which could be easily removed for the insertion and the removal of the coke. An outlet was provided through this end of the tube for the outgoing air. This outlet conducted the air through a solution of sodium hydroxide, and thence to a vacuum pump. Valves were provided so that the coke could be kept under air pressure, under vacuum, or simply in a steady stream of air at any rate of flow desired. The purpose of the sodium hydroxide solution was the adsorption of the sulphur dioxide produced by the roasting.

One rather serious source of error was present in these experiments, and to eliminate it entirely seemed impossible. This was the fact that one chunk of coke had to be taken as representative of the original coke, while several other chunks from the same batch were taken for the test. In other words, it was impossible to crush the coke to get a homogeneous sample, since the tests had to be run on the chunk sizes. However, from the analyses of different chunks from the same batch it was shown that the principal nonhomogeneity existed in the solid solution form of sulphur. Since this form remains unchanged in the coke under any treatment with the exception of actual destruction of the coke, the amount after every test was considered to be the same as that in the original sample, and the total sulphur was corrected accordingly. In this manner results were obtained which were comparable.

Test Two Varieties of Coke

Two different cokes were tested in this investigation. No. 1 was a high sulphur coke manufactured in a vertical retort. In this coke the solid solution form of sulphur predominated, so that little desulphurization was possible. No. 2 was a coke made from Illinois coal, and was of such a type that proper desulphurization could have made it available for blast furnace coke. The results of the different tests are given in the accompanying table.

In the runs where the vacuum treatment was used, it was not possible to reduce the pressure below 4 centimeters of mercury. This was due to the fact that the apparatus was of metal and was comparatively large, providing unavoidable leaks. Also the vapor pressure of the sodium hydroxide solution, which was in the system, was a limiting factor on the completeness of the vacuum obtainable.

Run No. 1 shows the effect of roasting and vacuum on the sulphur of the coke. Over half of the ferrous sulphide was oxidized, there being a slight decrease in the free sulphur, and a small increase in sulphate. The most disappointing feature of this run was the persistance of the free sulphur in the coke. The vacuum, apparently, was inefficient as far as the removal of the free sulphur was concerned. Test run No. 2 shows the effect of higher temperature on the results. Under these conditions more of the free sulphur is eliminated, but the final result was far from satisfactory. In run No. 5 the effect of long continued roasting is shown. The result is a much better oxidation of the ferrous sulphide, but this improvement is counterbalanced by the excessive formation of sulphates. The long roasting does not have much effect on the elimination of free sulphates. This retention of the free sulphur is the chief difficulty in any possible use of this process for the desulphurization of coke.

The desulphurizing effect of air on No. 2 is shown to be small by the results from run No. 9. By alternating the roasting and vacuum as in run No. 10, more desulphurization is secured than in the previous run; but the retention of free sulphur is still high. By putting the air for the roast under 4-pound pressure, and alternating this with the vacuum as in run No. 11, still better results were obtained. However, the results gave no promise of industrial utilization.

Desulphurization of Coke by Air

TEST NO 1

Run No.	Original	1	2	5
Temperature, degrees cent.	...	500	650	500
Roasting time, minutes	...	30	30	210
Vacuum time, minutes	...	10	10	none
Sulphur evolved as SO_2, per cent of coke	...	0.19	0.23	0.46
Coke loss, per cent	....	none	1	1
Sulphur as solid solution, per cent	1.90	1.90	1.90	1.90
Sulphur as ferrous sulphide, per cent	0.58	0.24	0.24	0.11
Sulphur as free sulphur, per cent	0.62	0.50	0.38	0.39
Sulphur as sulphate, per cent	0.10	0.13	0.10	0.31
Total sulphur, per cent	3.20	2.77	2.62	2.71

TEST NO 2

Run No.	Original	9	10	11
Temperature, degrees Cent.	...	500	500	500
Roasting time, minutes	...	30	...	...
Vacuum time, minutes	...	10	(a)	(b)
Sulphur evolved as SO_2, per cent of coke	...	0.08	0.08	0.14
Coke loss, per cent	...	none	none	none
Sulphur as solid solution, per cent	0.84	0.84	0.84	0.84
Sulphur as ferrous sulphide, per cent	0.26	0.16	0.12	0.10
Sulphur as free sulphur, per cent	0.19	0.23	0.18	0.15
Sulphur as sulphate, per cent	0.02	0.04	0.06	0.06
Total sulphur, per cent	1.31	1.27	1.20	1.15

(a) Alternate roasting and vacuum every few minutes for 20 times.
(b) Alternate roasting at 4 pounds air pressure and vacuum every few minutes for 20 times.

Can Oxidize Ferrous Sulphide

It is possible to draw the following conclusions from this investigation of the desulphurizing effect of air on coke:

1. At temperatures near 500 degrees Cent., it is possible to oxidize the larger part of ferrous sulphide in coke to iron oxide and free sulphur, without causing any appreciable oxidation of the coke itself.

2. The free sulphur produced as just described is retained in the coke in an absorbed form. It has been found impossible to remove this from the coke completely, and even part removal has been difficult. Several methods have been tried and the results may be briefly summarized as follows:

(a) Vacuum. The application of va-

cuum to the coke at the temperature at which the roasting was carried on is inefficient. Little or no free sulphur is drawn out of the coke by this method.

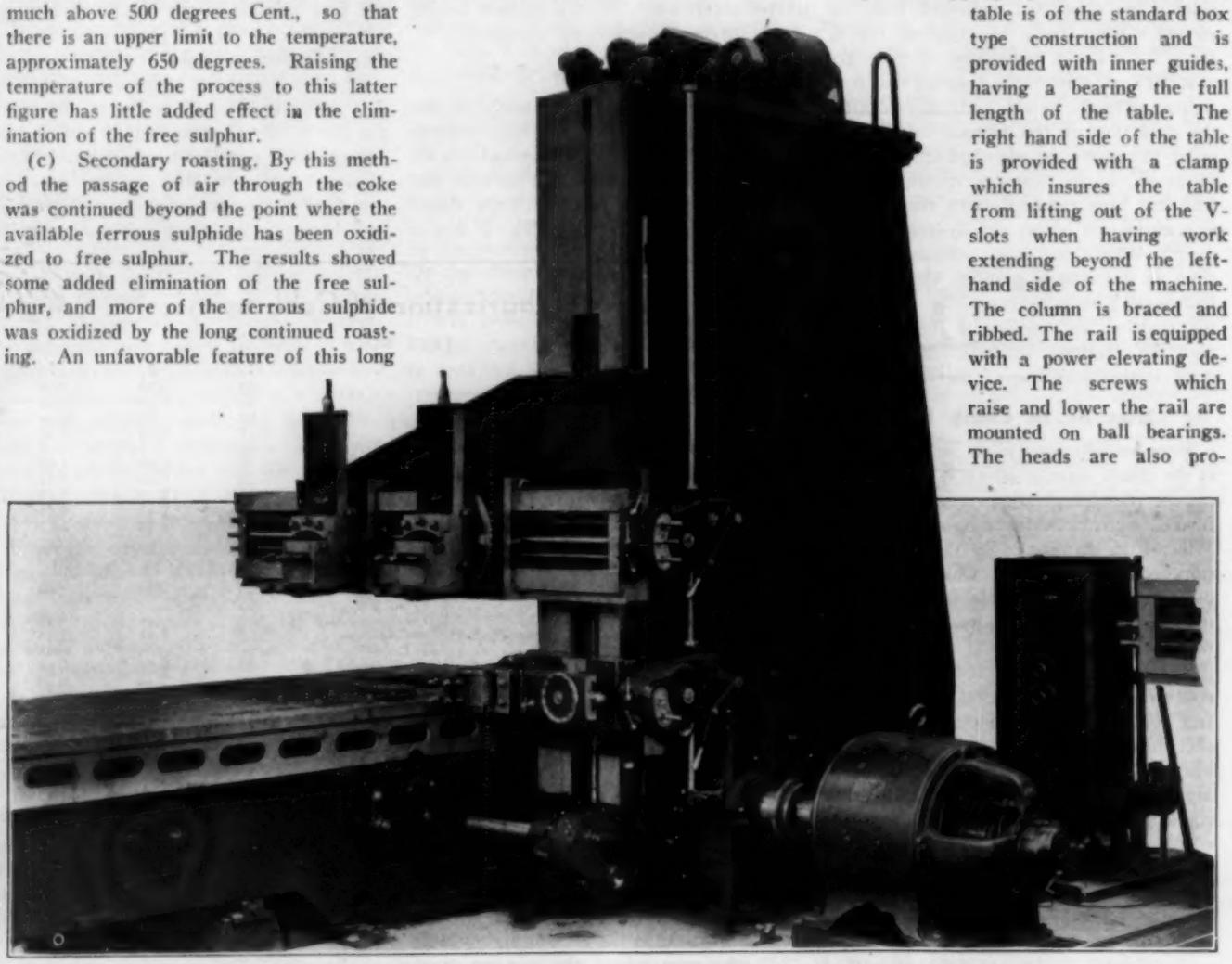
(b) Higher temperature. From an industrial standpoint, the temperature used in the secondary stage of the process to remove the free sulphur should be the same as that used in the primary stage of roasting coke, since it was impracticable to heat the coke after cooling down. On the other hand, the coke cannot be heated much above 500 degrees Cent., so that there is an upper limit to the temperature, approximately 650 degrees. Raising the temperature of the process to this latter figure has little added effect in the elimination of the free sulphur.

(c) Secondary roasting. By this method the passage of air through the coke was continued beyond the point where the available ferrous sulphide has been oxidized to free sulphur. The results showed some added elimination of the free sulphur, and more of the ferrous sulphide was oxidized by the long continued roasting. An unfavorable feature of this long roasting was the excessive formation of sulphates.

(d) Alternate repeated roasting and vacuum treatment. This method for reducing the free sulphur was tried both with the air at ordinary pressure and with a pressure of 4 pounds. The result was a somewhat increased elimination of the free sulphur but even then the major part of the free sulphur remained in the coke.

3. This investigation has indicated that the industrial desulphurization of coke by air treatment is not practical as far as the methods which have been tested would apply. The chief difficulty in the application of the process lies in the tenacity with which the free sulphur is retained in the coke. If a method could be found for the complete removal of this free sulphur, metallurgical coke undoubtedly could be improved by the air treatment, since the solid solution form of sulphur and the remaining ferrous sulphide enclosed in the coke walls do not have the contaminating effect on the iron in the upper planes of the blast furnace that would have the ferrous sulphide which is capable of oxidation by this process.

This investigation was carried out under the general supervision of A. C. Fieldner, supervising fuels chemist of the Pittsburgh experiment station, reports of investigations, bureau of mines.



OPEN SIDE PLANER WHICH HAS A RIGID BED OF BOX TYPE CONSTRUCTION

Make Changes in Design of Open Side Planer

Many changes have been made in the design of the open side planer manufactured by the Cincinnati Planer Co., Cincinnati. Besides having forced lubriation to the V-slots, as has been the standard on this type, the bearings in the bed are supplied with gravity lubrication. The oil is strained, settled and filtered several times before returning into the bearings, the gears and pinions. The rail is fastened to the knee, which is clamped to the column through two large T-slots. In place of using an ordinary bolt head or short nut, a long slide nut the length of the bearing of the knee is placed in the T-slots, thus providing a secure clamping surface. The bed is extremely rigid due to box type construction and is of extra depth. Oil pockets are cast integral with the bed and of such length as to prevent any oil dripping upon the floor. The table is of the standard box type construction and is provided with inner guides, having a bearing the full length of the table. The right hand side of the table is provided with a clamp which insures the table from lifting out of the V-slots when having work extending beyond the left-hand side of the machine. The column is braced and ribbed. The rail is equipped with a power elevating device. The screws which raise and lower the rail are mounted on ball bearings. The heads are also provided with rapid power traverse in all directions and are equipped with safety crank handles which add to the safety of the operator when throwing the rapid traverse. A limit stop is provided which prevents the rail from raising beyond the maximum height.

With control levers within easy reach, the operator is required to move from one position only when setting up work. The planer is 73 inches wide under the knee, the table is 62 inches wide and the total width of the machine is 182 inches. The machine is furnished power by a 35-horsepower motor. A view of the planer including the driving motor is shown in the accompanying illustration.

Controls on Planer Are Centerally Located

The G. A. Gray Co., Cincinnati, recently has introduced new types of 60 and 72-inch planers designed to increase production through the application of devices to simplify the work of the operator. The accompanying illustration shows a front view of the 60-inch planer. The controls are grouped in a position near the operator. The rail is raised by pushing the stirrup which hangs at the operators end of the rail. This rail is clamped by a few turns of the clamping screw located at the right end. This locks both ends of the rail to the inside edge of the housing.

The operator can move the rail head into position by shifting one lever at the end of the rail. The slides may be raised or lowered by using the middle traverse lever. It is claimed that the centralization of the control equipment permits the same ease of operation with the large type machines as is found in the 36-inch planer.

The feed dial is locked in place until the operator's hand touches the knob. Any feed between 0 and 1-inch can be had in steps of 0.01-inch, with positive feed. The oiling of the planer is accomplished by running the gears in a bath of oil. Oil is pumped to each of the shaft bearings and to the center of each V.

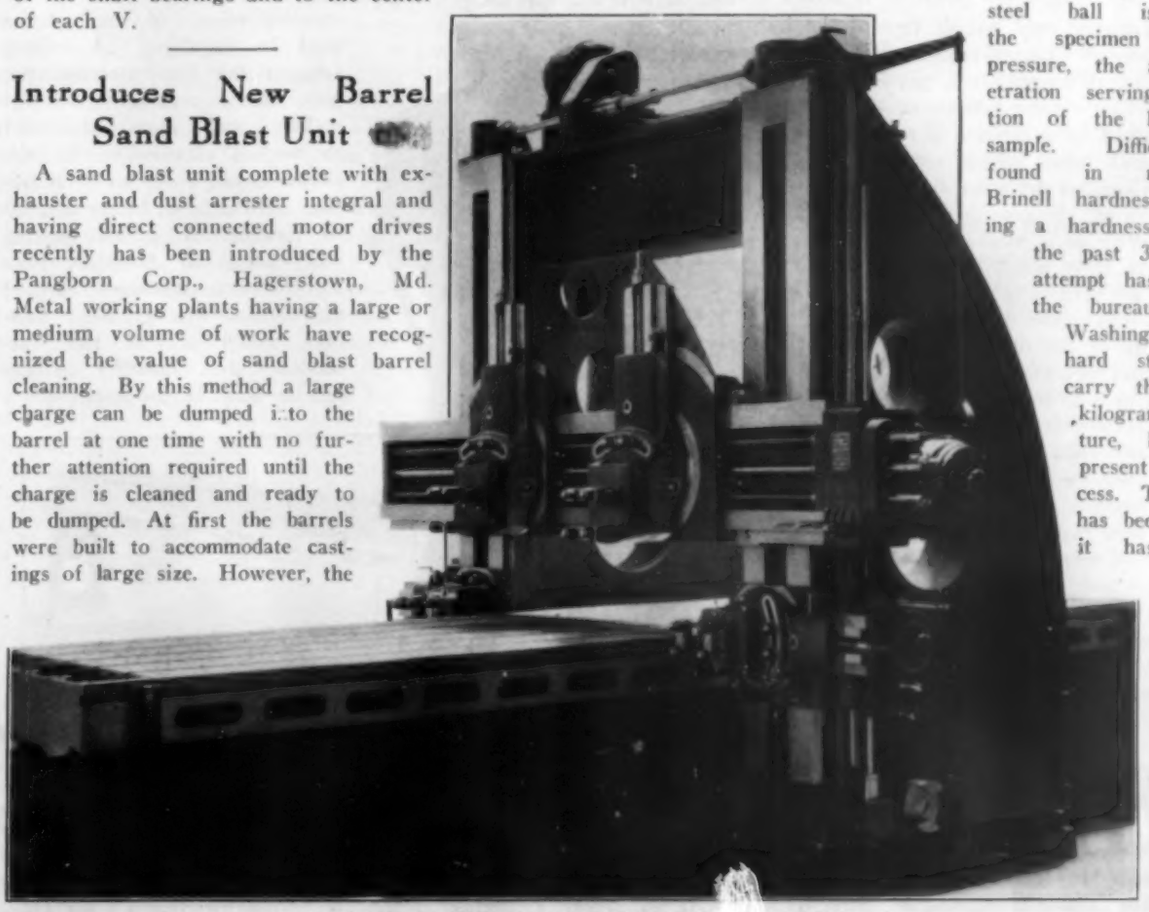
Introduces New Barrel Sand Blast Unit

A sand blast unit complete with exhauster and dust arrester integral and having direct connected motor drives recently has been introduced by the Pangborn Corp., Hagerstown, Md. Metal working plants having a large or medium volume of work have recognized the value of sand blast barrel cleaning. By this method a large charge can be dumped into the barrel at one time with no further attention required until the charge is cleaned and ready to be dumped. At first the barrels were built to accommodate castings of large size. However, the use of the sand blast has been extended to include other operations, namely, heat treating small parts, preparation of stampings, forgings and other small work. The accompanying illustration shows a barrel sand blast integral with exhauster and cloth screen dust arrester and with direct connected motor drive for barrel and exhauster. The units are shipped assembled and ready for operation by connecting the ventilating and compressed air pipes. The outfits are made in two sizes, the No. 1 barrel drum being 20 inches in diameter and 16 inches long and the No. 2 barrel having a drum of 30-inch diameter and a length of 20 inches. The overall length of either is 8 feet 10 inches. The device handles gray iron, malleable, steel, brass castings, forgings and stamped pieces. The accompanying illustration shows this compact unit, the barrel at the right and the exhauster at the left.

SAND BLAST UNIT HAVING EXHAUSTER AND DUST ARRESTER INTEGRAL

Studies Brinell Test Steel

In measuring the hardness of metals by the Brinell method, a hardened steel ball is forced into the specimen by hydraulic pressure, the amount of penetration serving as an indication of the hardness of the sample. Difficulty has been found in meausuring the Brinell hardness of steel having a hardness over 500. For the past 3 or 4 years an attempt has been made by the bureau of standards, Washington, to obtain a hard steel which will carry the load of 3000 kilograms without fracture, but up to the present without success. Tungsten carbide has been suggested, but it has been impossible to obtain this material in suitable condition in either this country or Germany. Recently a hard vanadium steel made at the bureau's laboratories has been tried and shows promise of suc-



A 60-INCH PLANER HAVING FEEDS UP TO 1-INCH

FIG. 1—CUTTING HEAD OF THE TUBE SHEAR WITH COVER REMOVED

cess. More of it will be made, and if future experiments are successful, an important advance in the art of hardness testing may result.

Alloying Elements Have Effect on Steel

(*Concluded from page* 1891)

ment that their presence only retards or accelerates the thermal changes bringing about refinement of structure. It is not beyond possibility that similar refinement can be brought about by other and perhaps purely physical means. Until such time, however, we can not get away from the fact that alloying elements in steel have served indirectly as a means to an end to bring about these physical conditions. Have they not then fully and justifiably played the part credited to them?

As to the merits of the different elements it appears that each one has a definite role assigned to it to bring out more pronouncedly than the rest, certain definite physical characteristics in the steel. The sole criterion of the accomplishment of these characteristics remains today, service. Let us hope that more scientific study of the role of alloying elements in steel will not give only insight into the workings of the alloying elements, but help to bring out newer types and compositions of steels, thus advancing not only the art of metallurgy, but the hopes and aspirations of our rapidly striding civilization.

Prepares To Schedule New Skelp Mill

No. 3 skelp mill of the Youngstown Sheet & Tube Co., Youngstown, O., is being warmed up prior to early scheduling. This 30 x 46-inch two-high reversing mill is of the universal type and replaces a 42-inch universal mill installed several years ago. It was built recently by Mackintosh-Hemphill Co., Pittsburgh, and is adapted for rolling universal skelp from 7¾ to 46 inches wide and for rolling sheared plates after removal of the vertical rolls up to 72 inches wide. Provision has been made for quick roll changing. The horizontal rolls can be changed from 30 to 40 minutes and the vertical rolls in about four hours.

Tube Shear Operates on New Principle

A cut-off machine for shearing pipe and tubing and operating upon a new principal has just been developed by the Tube Shear Co., Marquette building, Chicago. The principle of cutting is one of shearing over an arbor with a nonrotating ring shearing knife, steel, brass, or aluminum being cut with facility. As neither the tubing being cut nor the ring shear knife rotate, it is not necessary to chuck or hold the tubing. The action of the knife is one of concentrically shearing about the circumference of the tube. This method of shearing makes possible heavy duty work.

One of the heavy duty type machines is shown in Fig. 2, however, the design of the lighter type is similar, except that in the case of the latter, the shearing head is running continuously and consequently at a considerably higher speed. Fig. 1 shows the cutting head with cover plate removed and illustrates the mechanical advantage of having all the shearing load forces distributed in the plane of the shear. The machine generally is a back geared, single revolution shear operated with a foot treadle with a positive clutch mechanism and is handled the same as a plate or bar shear. It has a fixed stroke and two main adjustments, one for the knife and the other for the knife alignment. The stroke is governed by the maximum wall thickness of the tubing, in other words, in no case need the fixed stroke be made greater than the maximum wall thickness.

A feature of the new shear is the accessibility of the shearing knives which are plain hardened rings free from bolt holes or irregular surfaces. Thus it is a simple matter to machine, harden, regrind, or replace them. Liberal compensating takeups provide an adjustment for wear.

Postpone Standardization of Refractories

Indefinite postponement was the fate of the second meeting called by the division of simplified practice of the department of commerce to take up the standardization of refractories used in foundries. A month ago, at the first meeting, the half dozen representatives of makers and users expressed themselves favorable to the proposal but voted to defer action until a later, better attended meeting. A second meeting was called for Monday, June 18, but manufacturers notified the division that press of business would prevent their attendance. A meeting in the fall is now in prospect.

FIG. 2—TUBE AND PIPE SHEAR WHICH OPERATES ON A NEW PRINCIPLE

Training System Adapted by Newark Foundries

A uniform system for the training of apprentices was adopted by the Newark Foundrymen's association at a meeting in Newark, N. J., June 21. Officers were also appointed for the ensuing year, J. L. Carter, Barlow Foundry Inc., being elected president. A feature was an illustrated address by G. A. Richardson, Bethlehem Steel Co., on the manufacture of segments for the new Hudson vehicular tunnel, in New York City, a description of which appeared in the April 19 issue of IRON TRADE REVIEW. Mr. Richardson also exhibited moving pictures on the mining of iron ore in the Lake Superior district, and the shipment of the ore.

The plan for training apprentices calls for a 4-year course to be divided into eight terms of six months each. Pay during the first term is to be equivalent to 40 per cent of the prevailing hourly rate; for the second, 45 per cent; third, 50 per cent; fourth, 55 per cent; fifth, 60 per cent; sixth, 65 per cent; seventh, 70 per cent, and eighth, 75 per cent. The seventh and eighth terms may be shortened or omitted by agreement

Upon completion of the course, the apprentice is to be presented with a bonus of $100. The apprentice shall also attend classes in a vocational, technical, or correspondence school as required by the employer, the time to be accredited to the apprentice and included in his compensation. An effort will be made by the association to have the board of education in Newark equip a foundry in the Seymour vocational school, providing a place for this work.

Other officers elected are William Goldsmith, G. A. Goldsmith Co., Newark, vice president; J. A. Williamson, Isabel Porter Co., Newark, treasurer; and W. H. Mantz, secretary. The latter two officers held the same position during the past year. J. S. De Hart, Isabel Porter Co., is the retiring president. The executive committee follows: R. E. Moore, the Flockhart Foundry Co., Newark; A. E. Barlow, Barlow Foundry, Inc.; J. S. De Hart, Isabel Porter Co; G. Hannay, Barnett Foundry & Machine Co., Irvington, N. J. and D. L. Sacks, Louis Sacks Iron Foundry, Newark. Meetings will be suspended through the summer months.

Accepts Army Invitation

Announcement is made by the board of directors of the American Iron and Steel institute of the acceptance of the invitation of the Army Ordnance association to hold a meeting with the latter at the army ordnance proving grounds, Aberdeen, Md., next fall. At the recent meeting of the American Iron and Steel institute in New York on May 25, the membership was asked to give an expression as to whether such a meeting should be held and the response generally was one of approval. Under the circumstances, the next fall general meeting of the institute will be held at the Hotel Commodore, New York, on Thursday, Oct. 25, instead of Oct. 26, the regular date. The members of the Institute then will leave New York around midnight on Oct. 25, special train accommodations having been provided, and will arrive at Aberdeen the following morning, Friday, Oct. 26. The meeting with the Army Ordnance association will be held on that day and the members will return to New York or other destinations that night.

News of Societies

Past and Coming Meetings of National and Local Trade and Technical Organizations

THE New England Iron and Hardware association elected the following officers at its annual meeting held at Young's hotel, Boston, June 19: President, Myron B. Damon, Fitchburg, Mass.; vice president, Charles A. Haines, Boston; treasurer, Charles H. Breck, Boston; clerk, George J. Mulhall, Boston, who automatically becomes assistant treasurer and manager; directors, R. M. Boutwell, Fred L. Avery and C. H. Henderson, all of Boston; Clarence C. Dodge, Worcester, Mass.; M. B. Damon, Fitchburg, F. E. Bragg, Bangor, Me., Charles A. Adams Manchester, N. H., George M. Gray, Cambridge, Mass., and H. E. Nickerson and E. R. Brayton, both of Providence, R. I.

* * *

Society Awards Medal

The medal of the American Society of Mechanical Engineers for "some notable invention or striking improvement in connection with the industries" has been awarded to F. A. Halsey of New York. The honor was bestowed on Mr. Halsey because of his paper describing the premium system of wage payments which was presented before the society at the meeting in Providence, R. I., in 1891, and the adoption of the methods therein proposed has had a most profound effect toward harmonizing the relations of worker and employer.

* * *

Holds Annual Meeting

The Providence Engineering society, Providence, R. I., held its annual meeting June 15, when these officers were elected: President, Ralph W. Eaton; vice presidents, Frederick W. Bliss, Frederick C. Freeman and Francis B. Marsh; treasurer, Albert E. Thornley; secretary, John T. Barnicoat Jr.; councillors for three years, Albert C. Dickerman, Ralph L. Fletcher, Eugene W. O'Brien and Gardner T. Swarts Jr., James A. Hall is the retiring president.

* * *

Steel Treaters Meet

An informal address on "The Application of the Oxy-Acetylene Torch to Heat Treatment" was presented by S. W. Miller at the monthly meeting of the New York chapter of the American Society for Steel Treating, Woolworth building, New York City, June 20. Mr. Miller is associated with the Carbide & Carbon Chemicals Corp., New York, and is a past president of the American Welding society.

* * *

Foundrymen Picnic

Approximately 200 members and guests of the Pittsburgh Foundrymen's association attended the annual picnic of that organization held at Bongiovanni's Gardens, Wildwood, Pa., June 21. The afternoon was devoted to a sport program consisting of ball games, races, quoit contests, etc. This was followed by a chicken and waffle dinner. Henry P. Spilker of the Sterrit-Thomas Foundry Co., had charge of arrangements.

Convention Calendar

June 25-29—American Society for Testing Materials, annual meeting at the Chalfonte-Haddon hall hotel, Atlantic City, N. J. C. L. Warwick, 1315 Spruce street, Philadelphia, is secretary.

June 25-29—American Institute of Electrical Engineers. Annual convention at Swampscott, Mass. F. L. Hutchinson, 33 West Thirty-ninth street, New York, is secretary.

Sept. 24-28—American Association of Iron and Steel Electrical Engineers. Convention and exhibition. Auditorium, Buffalo. Headquarters of the association are located at 1007 Empire building, Pittsburgh.

Foundrymen Study Steel Practice

Institute of British Foundrymen at Annual Meeting in Manchester Compare British and American Steel Foundry Methods—Find Similarity Great—Exchange Papers Are Well Received—Cores and Binders Receive Considerable Attention

MANCHESTER, Eng., June 15.—American and British steel foundry methods show more points of similarity than divergence. In converter and open-hearth shops the practice of the two countries is identical in many respects, and the physical and chemical characteristics of the castings show considerable similarity. While still preferring acid steel for many purposes, British users of steel castings are showing a growing appreciation of the field for the basic open-hearth furnace. British foundrymen also express hearty sympathy with the American method of setting up specifications for steel castings through co-operation between the producers and consumers. On the other hand, electric steel is not making the progress in England that it is in America, and there also exists considerable sentiment in the old country in favor of the basic-lined electric furnace.

These were some of the chief points of international technical interest brought out at the twentieth annual meeting of the Institute of British Foundrymen, at Manchester, England, June 13-15. In accordance with the usual custom at the annual meeting, only four papers were read and discussed at the two morning sessions, the majority of this society's papers being presented during the fall and winter at the monthly meetings held by the 11 branches of the institute. Two of the four papers dealt with steel foundry practice, one being the exchange paper presented on behalf of the American Foundrymen's association by Major R. A. Bull, research director, Electric Steel Founders Research Group, Chicago. This paper, parts of which will be published in IRON TRADE REVIEW is a broad and comprehensive survey of American steel foundry practice, entitled, "The Manufacture of Steel Castings in the United States." The other steel paper, which was entitled, "The Manufacture of Steel Castings and Preparation of Sand," by F. A. Melmoth, Braintree Castings Co., near London, dealt with the subject from the British standpoint. An unusually favorable opportunity therefore was afforded to make direct comparisons between the steel foundry methods of the two countries. The two remaining papers were concerned with coreroom and gray iron foundry practice respectively.

The meetings were held at the Manchester College of Technology. The proceedings were opened on Wednesday morning, June 13, with an address of welcome from W. Cundiff, lord mayor of Manchester, who then presented the Oliver Stubbs gold medal to W. H. Sherburn, Richmond Gas Stove Meter Co., Warrington, in recognition of his work in the early days of the British Foundrymen's association, and for his paper on "The Evolution of the Foundryman," which has been widely distributed among workmen by large British employers.

Name is Changed

It was announced that to conform with certain provisions of the royal charter the name of the association has been changed from Institution of British Foundrymen to Institute of British Foundrymen. This change was approved unanimously by the members present at the Manchester conference, and the word "Institute" hereafter will be used in the title of the society.

Before the reading and discussion of papers started, the newly elected president, Oliver Stubbs, Joseph Stubbs Ltd., Manchester, was conducted to the chair. This is Mr. Stubbs' second term of office. He was president in 1921-22, during which period he paid an official visit to the United States. He emphasized the necessity for fostering foundry education and recomended the establishment of junior branches, of which boys interested in foundry work could be members. He also pointed out the importance to the institute of the complete organization of its various branches which now cover the entire British isles.

Mr. Stubbs again referred to the importance of the cordial international relations which are being fostered through the co-operation of the Institute of British Foundrymen, the American Foundrymen's association, and the Association Technique de Fonderie de France. He said he hoped a large number of American foundrymen would come to Europe in September to join with the British foundrymen in making the international foundrymen's congress in Paris a success. He traced at some length the growth of the movement toward greater international co-operation between foundrymen, in which he has taken a special interest. At the conclusion of the session greetings from the British foundrymen were telegraphed to the French and American associations.

A special welcome was extended to two visitors from the Unites States, Henry M. Lane, head of the H. M. Lane Co., Detroit, and A. O. Thomas, Detroit, who is associated with Mr. Lane.

The first paper presented was entitled "Oil-Sand Cores and Binders," by Prof. A. Campion and J. McEachen, associated with the Scottish foundry research organization at Kirkintilloch, Scotland. In this paper the relative merits of a unmber of core binders of the linseed oil type are discussed in the light of experiments made by the authors. It is pointed out in the paper that the best results in drying oil-sand cores are obtained from a temperature of 400 degrees Fahr., equivalent to 205 degrees Cent., or less. In most cases, it is stated, the most satisfactory results are obtained from a drying temperature of 300 to 350 degrees Fahr., equivalent to 150 to 175 degrees Cent. Cores dried at low temperatures for a relatively long time have a better skin and stronger edges than those subjected to a higher temperature for a shorter time.

The paper includes a table of the transverse, tensile and crushing strengths of cores made from 12 different binders. The test core was ½-inch square and 7½ inches long, tested between 6-inch centers, the two halves being subsequently broken on 3-inch centers. The tensile tests were made on cores of the standard cement brique shape with necks 1-inch square. The table reveals great variation between the different binders, which from a commercial standpoint are supposed to be practically the same. The transverse strength of the 6-inch bars varied from 7.46 pounds to 84.0 pounds, and the tensile strengths from 11.2 to 70.5 pounds per square inch. The proportions were one of binder to 20 of sand. The cores were given practical foundry tests where they also showed great variation.

The paper was criticized by various speakers for its incompleteness, it being claimed that the number of tests made was insufficient to justify conclusions. Other speakers complained that the authors offered no information as to the composition or character of the various binders tested, and also stated that a ½-inch square bar has too small a cross section to give reliable results.

Other speakers said the authors should be complimented for revealing the results of experiments which are admittedly incomplete, the data so far obtained being of great value.

Determines Baking Temperature

One of the principal discussions was submitted by Henry M. Lane, Detroit, who reviewed the results of his own work on core binders. He said the problem is one of collodial chemistry, the action of the binder depending on that of interfering and supporting colloids. Mr. Lane explained the method he used to determine the true temperature of the center of a core during experiments on baking. These experiments, he said, showed that after a period of constant temperature, 212 degress Fahr., while the water was being driven out, the temperature of the core rose gradually but did not fully reach the oven temperature even after 24 hours continuous heating.

F. J. Cook, Rudge-Littley Ltd., West Bromwich, referred to Mr. Lane's researches on oil binders, but expressed a preference for having the sand dried. He also said that a great improvement in results can be obtained by emulsifying oil and water, using the emulsion when making the core. J. Cameron, Cameron & Roberton Ltd., Kirkintilloch, Scotland, called attention to the usefulness of such researches as those of the authors in making possible the use of local sands.

The two steel foundry papers were read at the Thursday morning session, June 14. In the absence of the authors, Major Bull's paper was read by H. Cole Estep, European manager, IRON TRADE REVIEW, and Mr. Melmoth's paper was presented by V. C. Faulkner.

In his paper Mr. Melmoth agrees with Major Bull on the question of sulphur, saying, "the influence of sulphur and phosphorus has been somewhat exaggerated. In the author's experience large numbers of intricate castings made from steel containing 0.06 to 0.08 per cent sulphur have not given the slightest difficulty. Also steel containing 0.10 per cent or more of phosphorus shows no signs of inferiority under the ordinary tests to which castings are subjected, the tensile and elongation capabilities of the metal being almost, if not quite, as good as that containing the merest trace of phosphorus."

In discussing these two papers, Victor Stobie, Stobie Electric Steel Co., said: "We can assure Major Bull that we of the foundry trade in Great Britain well recognize that quantity production would have died a most early death had quality not played a sufficient role in such production. Only writers in the daily press can afford to disregard logic in the building up of kaleidoscopic wonderment, and the pictures such writers conjure up of the 'press the button and the plant does the rest' type of industry in the United States is well qualified to make all serious technicians in America feel they are being misunderstood. In this country we are not all quite convinced that a steel casting of 0.055 per cent sulphur will ordinarily and always be equal in technical value to a casting of 0.015 per cent. One advantage of low sulphur lies in the fact that such castings can be treated properly in a shorter annealing time than the higher sulphur metal."

A. Rhydderch, Hadfields Ltd., Sheffield, commented on the fluidity or life of converter steel, which cannot be explained, he said, by the heat generated from the reactions on the silicon and manganese. W. H. Poole, Keighley Laboratories, Keighley, Yorkshire, spoke of the usefulness of the acid-lined electric furnace. When the slag forms a film around the crystals of steel, he said, the fluidity is affected and otherwise good metal freezes quickly.

Efforts which are being made in England to devise a suitable fluidity test for steel were alluded to by Dr. Percy Longmuir, director, British Cast Iron Research association, Birmingham, who said that British foundrymen generally extended a warm welcome to R. A. Bull's paper. Casting temperature, Dr. Longmuir declared, has a distinct effect on the mechanical properties of the metal and should be adjusted to the size and section of the casting. In England, he also said, there is no special difference in the roof life between acid and basic lined open-hearth furnaces.

V. C. Faulkner, London, defended the use of aluminum saying that many of the difficulties arising from its employment are due to the fact that proper efforts are not made to get the aluminum actually into the steel. He also told of an aluminum-iron alloy now being made for grate bars containing 10 per cent aluminum, which sweats out the surface, where it forms alumina and is said to increase the heat resisting qualities of the bars considerably.

Paper From France

For the first time, an exchange paper also was presented on behalf of the French Foundrymen's association, entitled, "Notes on Carbon in Foundry Irons and Castings: Utility of Its Control and Practical Difficulties," by Professor Siegle of Nancy University. In this paper the effects of silicon and carbon were discussed and more scientific classifications of foundry pig iron than those in general use were suggested, based on silicon and sulphur. The advisability of also taking carbon into account when buying pig iron is discussed by Professor Siegle. He confirms the fact, first brought to light by American investigators, that the addition of steel scrap to cupola charges does not necessarily lower the total carbon owing to the absorbtion of carbon from the coke.

In the absence of the author, this paper was read by R. Buchanan, foundry engineer, Birmingham, who in his discussion referred to the debt which foundrymen the world over owe to the work of the late Thomas D. West. F. J. Cook, discussing the paper, recommended the grading of pig iron more on a basis of carbon and silicon than fracture, but pointed out that iron does have certain qualities not dependent on chemical composition, the scientific basis of which may be the differences in solubility of the different kinds of carbon in the iron. Professor Rheade of the Manchester College of Technology also referred to the fact that graphite differs in iron and that some kinds are much less readily soluble than others.

The attendance at the meeting was unusually large and the entertainment features were complete. In addition to the inspection of plants and trips to various points of interest near Manchester, the annual banquet was held Wednesday evening, June 13 at the Midland Hotel. A musical program was provided and addresses were made by Cundiff, lord mayor of Manchester; W. Clare Lees, president of the Manchester Chamber of Commerce; Oliver Stubbs, president of the Institute of British Foundrymen; and H. Cole Estep, representing the American Foundrymen's association.

New I. B. F. Officers

1923-1924

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Oliver Stubbs,
Joseph Stubbs, Ltd.,
Manchester.

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Junior Vice President,
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General Secretary,
W. G. Hollinworth,
38 Victoria street,
London.

Foreign Steel Becomes More in Evidence

(*Continued from Page* 1866)

trade is over for the present the enginemen and shunters having waived their claim for an increase of 15 shillings per week, subject to its consideration by the joint meeting of the wages board to be held at Swansea at the end of the month.

Recent reports from America of the large tin plate business, and full order books to the end of the third quarter, have encouraged Welsh makers to look for expanding international business. It is assumed that America's home demand will absorb the mill output, leaving a comparatively clear field for South Wales in other markets.

The steel scrap business is practically stagnant. The large consumers have not found it necessary to re-enter the market. Some sales are said to have been made as low as £3 15s ($17.28) for heavy steel scrap. The arrangement just concluded by George Cohen & Sons and Sir W. G. Armstrong Whitworth & Co., Ltd., with the disposal and liquidation commission, to sell on their behalf the remaining stocks of locomotive and railway plants with a lot of other machinery remaining over from the war, is expected to bring a great deal of old material into the market. Some 16 factories are to be employed in the breaking up of material which is said to represent 3,000,000 tons of metal, the entire value of the contract being roughly estimated at £6,000,000. A large amount of ammunition is to be broken up.

French Steel Market Is More Active

European Staff Special

PARIS, June 15.—Germany's latest proposals confirm the opinion of French industrial leaders that Ruhr occupation is likely to continue for many months. The French, therefore, are taking measures to insure their receiving ample coke supplies to operate their blast furnaces until such time as allied pressure forces the Germans to yield. In this they have only one road left open and that is the exploitation of Ruhr coke ovens. Even if these plans are carried out there is little possibility of increasing iron and steel production appreciably, which fact is giving a firmer tone to the market. The group having charge of the distribution and fixing of prices of imported and reparations coke has just voted to maintain the price at 180 francs ($18.80) for July, in view of recent increases in Germany.

Despite the fact that coke supplies have been far below normal for many months, French furnaces have succeeded in maintaining their exports. During the first three months of this year, France exported to Great Britain 11,500 tons of pig iron; to Belgium and Luxemburg 101,407 tons; to Germany 14,253 tons; to the Sarre 25,721 tons; to Italy 23,232 tons and to other countries 24,850 tons. Foundry pig iron (2.00 to 3.00 per cent silicon) is quoted around 390 francs ($23.40). Hematite averages 440 francs ($26.40) f.o.b. furnace. The Acieries du Nord & de l'Est quote 400 francs ($24) on chill-cast No. 3 foundry iron and 385 francs ($23.10) on sand cast.

Franc—$0.065

The steel market is beginning to show signs of renewed activity and this condition is reflected in the firmness of prices. Basic bessemer blooms have been sold as low as 470 francs ($28.20) and billets, 500 francs ($30).

Several transactions in merchant bars have been reported. The average price is 600 francs ($36) base, per metric ton. Bolt rods from 10 to 30 millimeters diameter are quoted at 630 francs ($37.80) by a Lorraine mill. The railroads are buying large quantities of beams and angles for use in electrification.

The Franch again are feeling Belgian competition on plates and sheets. A Belgian mill is offering sheets, 1 to 2 millimeters thick, to French buyers at 960 francs ($57.60) per metric ton. Manufacturers of electrical equipment continue to obtain their requirements of high silicon sheets abroad. Since the occupation of the Ruhr the Germans have dropped out of the market, thus increasing the demand for English and American sheet. The American Rolling Mill Co. and the United States Steel Products Co. are well known in the French market as makers of high grade transformer sheets. The most active English competitor is Lysaght. At present the latter is offering lower prices and fairly prompt shipment with the result that most of this business is now going to England.

Pipe prices have dropped 25 points since the beginning of May. Tube mills are now quoting 20 per cent majoration on the French list on carload lots. This works out at about 1800 francs ($108) per metric ton.

Belgian Market Conditions Improving

European Staff Special

BRUSSELS, June 15.—The tone of the market is much firmer and production is being increased to meet the growing demand. The railroad strike has been settled and transportation again is becoming organized. Leaders of industry expect a marked improvement in general business conditions. Prices of iron and steel products are already beginning to stiffen. Two weeks ago merchant bars were being offered at 560 francs ($30.80) f.o.b. Antwerp, but at the present time it would be difficult to place an order at much less than 575 francs ($31.60).

Franc—$0.055

Now that freight is again moving freely, coke ovens are being relighted, thus permitting blast furnace operators to blow in new units.

One of the factors which has undoubtedly had considerable influence in stabilizing the market is the conclusion of the pourparlers between France and Belgium concerning Ruhr occupation policy and general reparations questions. France and Belgium apparently are working together in perfect harmony. Both countries agree that Germany's recent proposal is unacceptable. Furthermore plans are being formulated to exploit the German industries in the Ruhr if the latter continue their policy of passive resistance.

Luxemburg blast furnaces produced 95,931 tons of pig iron during April as compared with 95,468 tons during the preceding month. Steel production during April amounted to 78,866 tons.

Steel from Ruhr Now Arriving in Japan

Foreign Special Service

TOKIO, Japan, June 14.—Importations of finished steel products from the Ruhr have been resumed and fairly large tonnages of bars, plates and shapes have arrived. These are part of a large order placed with German makers before the French occupied the Ruhr. The purchases were made through British traders and at the Kobe customs house the material is registered in the name of British firms. The quality of the steel is reported to be excellent, while the price at which the shapes are offered is as low as 90 yen ($44.10) per ton. The agents of German makers who rave been active in the Japanese market recently state that larger shipments are to follow.

Yen—$0.49

Belgian and Czecho-Slovakian steel shapes also have been sold in the Japanese market recently, and orders for medium size lots have been booked. The

steel has not yet arrived at the destination in this country.

The prospects for a larger supply of imported steel is leading Japanese buyers to be cautious, and the credit situation in Japan is unfavorable. The government steelworks have been forced to make substantial reduction, amounting to 15 to 16 yen ($7.35 to $7.84) a ton on bars, and 15 to 20 yen ($7.35 to $9.80) on shapes and sheets. The works' new price on round bars is 124 yen ($60.76) per ton; on flat bars 125 yen; plates 120 yen ($61.25) and sheets 200 yen ($98).

Melters have been buying small lots steadily and the visible stock of pig iron has fallen to about 140,000 tons. The decrease is hardly noticeable in Tokio and Osaka where additional imports have been received from India, China and Manchuria. In Osaka, where the Hanyang Iron Mill is unloading its surplus stock at low prices, the tendency to accumulate material is noted. The Penchifu Iron & Coal Co., which recently decided to relight its furnaces announces that it will soon place its pig iron on the market at a yearly rate of 45,000 tons. Consumers continue buying hand-to-mouth in expectation of lower prices.

Pig iron prices have been reduced 2 to 3 yen ($0.98 to $1.47) per ton. No. 1 Japanese iron is 68 yen ($33.32); No. 2, 63 yen ($30.87); No. 3, 60 yen ($29.40). Hanyang No. 1, from China, is 63 yen ($30.87). The price of iron from the Middlesbrough district of England still is nominally 85 yen ($41.65).

German Coal and Iron Imports Dwindle

European Special Service

DÜSSELDORF, Germany, June 13.—No further purchases of American iron, steel or coal on German account are now being made. English fuel still is being imported but in smaller quantities. Little iron and steel is being produced now in the Ruhr district and the workmen are employed mainly on repair and development work, the bulk of their wages being paid by the German government.

Fuel production in the Ruhr territory also has decreased to a minimum and as the French authorities still are occupied in removing all remaining stocks, including retail stocks of household coal, it is expected that in a few weeks none will be left. Production in the unoccupied territory also has declined greatly as the unions have put a stop to the working of overtime and there is a strike of miners in Silesia.

Mark—$0.0000125

The transport situation is worse. A few Dutch tugs and lighters still are bringing in a small amount of English coal on the Rhine, subject to payment of the coal tax and other requirements of the Rhineland commission, but there is now no traffic on the canals. At Thyssen works, 73 Rhine lighters have been loaded with steel but are unable to leave in consequence of difficulties over export licenses which, although now theoretically obtainable from the French authorities, are almost impossible to get owing to the amount of red tape connected with their issue.

Prices continue to rise with the fall of the mark and export business from occupied territory has almost ceased. Many works are closing down and others are operating only three days a week. The French authorities have seized 6000 tons of iron and steel from German producers who have failed to pay the coal tax and have occupied the Krupps blast furnace works near Coblenz following their refusal to pay this tax. It is said that if Krupps at Essen continue to refuse payment the French authorities have threatened to sell the works by auction.

Britain's Export Business Falling Off

European Special Service

MIDDLESBROUGH, Eng., June 14.—A marked falling off in the foreign demand for iron and steel and exporters are finding business difficult to maintain. Manufacturers are concerned as to their position when present orders are completed. At the beginning of May the situation was regarded hopefully but during the month the volume of business in iron and steel was much below the average of previous months. Cleveland iron prices have declined 5 shillings ($1.10) per ton and hematite prices are weaker. The Belgian strike, which is now over, has seriously affected deliveries and there are offers of billets from overseas at prices below home quotations.

The heavy cost of fuel prevents an immediate expansion of trade and the overseas demand for coal and coke keeps prices up. Export coke however, is cheaper and has been sold at £3 2s 6d ($14.50) a ton. France, Germany and Norway have placed substantial orders for coal. A French contract for coking coal was fixed at £1 18s 9d ($8.95) per ton c.i.f. Rouen, and for 100,000 tons of Durham coal for the French state railways for delivery up to December at £1 2s 6d ($5.20) f.o.b.

Pig iron exports in June are likely to show a further decrease compared with May during which month 20,725 tons of iron was shipped to 46 overseas destinations. The total iron and steel exports was 62,843 tons. Indian business continues the most active. An outlet for material is being found in Finland and the British Dominions. Details of iron and steel exported from the Middlesbrough district in May, according to countries of destination are as follows:

Sterling—$4.63

Destination	Pig iron	Finished steel	Total tons
Argentine Republic	....	880	880
Belgium	1,927	31	1,958
Brazil	78	125	203
Burmah	23	939	962
Cape of Good Hope	80	806	886
Ceylon	13	867	880
China	120	757	877
Chili	....	232	232
Denmark	272	88	360
Egypt	196	2,941	3,137
Finland	2,180	....	2,180
France	3,745	636	4,381
Germany	3,862	613	4,475
Hong Kong	1	1,207	1,208
India	2,456	9,879	12,335
Italy	2,146	4	2,150
Japan	506	3,712	4,218
Natal	197	1,383	1,580
New South Wales	180	2,149	3,329
Nigeria	87	548	635
Sweden	1,045	109	1,154
United States	4,281	....	4,281
Victoria	35	6,552	6,587
Other countries	1,295	2,650	3,945
Total	24,735	38,108	62,843

Imports of iron ore to Middlesbrough during May totaled 168,114 tons compared with 198,511 tons in April and 211,431 in March. There is little immediate demand. Rubio ore is £1 4s 6d ($5.56) per ton, c.i.f. Middlesbrough, with a freight of 8 shillings ($1.84). About the same freights prevail on shipments of Spanish and African ore going to America.

The imports of pig iron into the Tees are on the down grade. During the past seven months 4692 tons have been discharged against over 30,000 tons a year ago and 181 tons in the seven months preceding the war. On the other hand there was an increase of 2500 tons of sheet bars, billets, etc., imported this year and the r ipts of plates, angles, rails, etc., advanced from 3158 to 7146 tons.

Freight rates on iron and steel from Middlesbrough are as follows per gross ton: To New York, 15 shillings ($3.47); to San Francisco, 26 shillings ($6.05); to Antwerp, Rotterdam and Calais, 9 shillings ($2.08); to Rouen and Dieppe 15 shillings ($3.47).

To Sell Motor Plant

On Aug. 15 the property of the Mitchell Motors Co., Inc., Racine, Wis., will be offered for sale at trustee's auction. The sale will be held at the offices of the plant at Racine Junction under the direction of Herbert F. Johnson, receiver. Appraisals of the property now are in process and are expected to be completed by July 15, giving bidders 30 days in which to inspect the schedules. The entire value of the plant is plant at $3,000,000 according to schedules filed with the petition in bankruptcy. Liabilities are in the neighborhood of $4,000,000.

Rapid Advance Made in Wages

Iron and Steel Plants' Payrolls in May, 13.1 Per Cent Over April, Show Larger Gain Than in Any Other Industry—Average Monthly Pay $133—Only 2 Per Cent Increase in Personnel

WASHINGTON, June 26.—Wages in the iron and steel industry advanced more rapidly than in any other industry in May, according to the bureau of labor statistics of the department of labor. May payrolls were 13.1 per cent greater than those for April, while personnel in May was only 2 per cent over April. Reducing the bureau's wage statistics to a monthly basis, iron and steel workers averaged $133.08 in May compared with $119.52 in April and $93.52 in May, 1922.

Comparison of the iron and steel industry for May with May last year, this May reveals an increase of 19.9 per cent in volume of employment and 67.8 per cent in volume of payrolls. The per capita increase in payrolls in May was 10.8 per cent.

In May, agricultural implement works were employing 2.1 per cent fewer persons than in April but were paying them 0.8 per cent more than in April. In the automobile industry the May advance in employment was 1.4 per cent and in payroll 1.8. Foundries and machine shops reported a gain of 0.6 per cent in employment and 3.5 per cent in payrolls. Hardware plants dropped 2 per cent in employes but gained 5.7 per per cent in payrolls. Steel shipbuilding plants receded 3.2 per cent in personnel but increased their payrolls 6.6 per cent.

Comparisons of wages and personnel in the iron and steel industry since 1916 are given in the accompanying table.

The supreme court of the state of Washington has decided that trade unions are liable for damages incurred when employes are called from their work on sympathetic strike. In the case of the Pacific Typesetting Co., against the International Typographical Union et al the court recently reversed a lower court decision and demanded for trial a suit for $20,000.

Labor Unrest Reduces Swedish Output

Washington, June 26.—The labor unrest in Sweden since the beginning of the year is reflected in the greatly reduced output of the iron industry, Assistant Trade Commissioner H. Sorenson reports to the department of commerce. The entire pig iron production in Sweden for the first three months of 1923 amounted to only 37,300 metric tons as against 57,400 tons for the corresponding period of 1922, and 186,100 tons for 1914, according to the report just published by the Swedish Iron Works association.

As a result of the general lockout situation, there has been a considerable drop in the number of furnaces in operation. Of 132 blast furnaces only 18 were active; of 204 Lancashire furnaces but 29 were working, none of the 18 bessemer furnaces produced, two of the 82 martin furnaces were in blast and three of the 27 electric steel furnaces were operating. Exports during the quarter, however, improved, the total quantity of all kinds of iron and steel shipped amounting to 48,600 tons as compared with 37,400 tons for the first quarter of 1922. The increase was due solely to pig iron exports.

Polish Ore Output Gains

Washington, June 26.—In 1922 Congress Poland produced 316,000 metric tons of iron ore from 26 mines operated by 4998 workmen, according to a report to the department of commerce. This compares with 241,000 tons from 25 mines operated by 4437 workmen in 1921, and with 311,000 tons from 26 mines operated by 3237 workmen in 1913. Galicia, which turned out 19,000 tons of iron ore in 1913, has had no output in the past few years. The seven mines operated by Polish Silesia produced 76,000 tons of iron ore in 1922 and 62,000 tons in 1921, as contrasted with a prewar production of 138,000 tons from 10 mines in 1913.

May Sheet Production and Sales Increased

Reports from independent sheet manufacturers to the National Association of Sheet and Tin Plate Manufacturers show that sales increased by 58,720 tons in May over April. Production increased 5198 tons, while shipments were 24,496 tons larger. Unfilled tonnage on hand June 1 was 551,139 tons while on May 1 it was 577,696 tons. Finished stock on hand awaiting shipment increased from 115,574 tons May 1 to 118,384 tons June 1. Tonnage on hand unsold June 1 was 23,397 tons while on May 1 it was 24,470 tons. The following is a complete comparative table for the two months:

	Net tons May, 1923	Per cent to capacity	Net tons April, 1923	Per cent to capactiy
Total sales for month	242,624	82.7	183,904	658
Total production	260,006	88.6	254,808	90.9
Total shipments	278,059	94.7	253,563	90.5
Unfilled tonnage end of month	551,139	187.7	577,969	206.2
Awaiting shipment	118,384	40.3	115,574	41.2
In stock, unsold	23,397	7.9	24,470	8.7

The total number of hot mills in the United States is 668, having a capacity for May of 420,000 tons. The percentage of this capacity to which the figures for May relate is 70 per cent. In April the percentage was 72.8.

Average Monthly Wages in Iron and Steel Industry, and Number of Employes

	Number of establishments	Number of employes	Payroll for half month	Average wage per month	Average wage year previous
May	175	241,351	$16,080,907	$133.08	$93.52
April	182	218,591	13,062,933	119.52	88.14
March	189	241,068	14,885,085	123.52	89.02
February	187	223,615	13,668,599	122.24	85.58
January	184	217,303	13,032,701	119.42	78.70
December, 1922	133	195,602	11,860,426	121.06	89.32
November	132	185,488	11,036,241	118.90	92.68
October	140	176,387	9,903,466	112.28	81.80
September	126	164,731	8,858,008	108.02	77.40
August	125	153,260	7,424,212	97.04	84.88
July	110	142,721	5,941,489	83.26	76.96
June	110	146,087	6,906,566	94.58	87.82
May	106	136,593	6,383,730	93.52	97.64
April	108	125,089	5,509,555	88.14	106.33
March	113	120,663	5,341,971	89.02	122.18
February	108	119,463	5,306,863	85.58	129.70
January	106	103,056	4,055,652	78.70	150.16
Averages:					
1922	118	147,882	7,378,535	98.78	.....
1921	114	117,223	5,869,438	100.12	.....
1920	105	172,318	13,015,883	151.06	.....
1919	105	154,244	9,989,098	128.22	.....
1918	97	180,859	10,734,114	118.74	.....
1917	97	180,088	8,327,492	92.49	.....

Men of Industry

Personal News of a Business Character Pertaining to the Iron and Steel and Related Fields

CAPTAIN ROBERT W. HUNT, head of Robert W. Hunt & Co., Chicago, the guest of honor at the annual meeting of the Western Society of Engineers at Chicago June 19, was the recipient of the Washington award for the present year, for his pioneer work in the development of the steel industry and for a life devoted to the advancement of the engineering profession.

The award is an inscribed tablet, one of which is presented annually to an American whose work has been of great benefit to the country. The award was founded by John W. Alvord in 1916. In 1922 it was given to Herbert Hoover, secretary of commerce. It is conferred by a commission representing the Western Society of Engineers, the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the Amercan Society of Mechanical Engineers and the American Institute of Electrical Engineers.

Captain Hunt is a veteran of the civil war, is 86 years of age and still active. He began his work in rolling mills in 1856 and was the first to establish a chemical laboratory in a steel plant.

George Gordon Crawford, president, Tennessee Coal, Iron & Railroad Co., sailed last week for a tour of Europe.

Edward J. Pearson, secretary and treasurer of the Jewell Belting Co., Hartford, Conn., has returned from a two months' trip to Europe.

Frank Roe Batchelder, treasurer and general manager of the Mills Belt Co., Worcester, Mass., sailed for home June 13, after a two months European trip.

Frederick S. Blackall, president and general manager of Taft-Pierce Co., Inc., Woonsocket, R. I., recently returned from a trip around the world.

J. H. Van Alstyne, recently elected president of the Otis Elevator Co., New York, was formerly a vice president of that company.

Gen. Otto H. Falk, president of Allis-Chalmers Mfg. Co., has returned to his home in Milwaukee after spending two months in Europe.

Samuel L. Smith, vice president, National Malleable Castings Co., Cleveland, has arrived in London on a business trip which will take him to Berlin and other parts of the Continent.

William Arter, president and general manager of the Persons-Arter Machine Co., Worcester, Mass., sailed from Boston, June 1, for a European trip.

Jerome R. George, vice president of

CAPT. ROBERT W. HUNT

the Morgan Construction Co., Worcester, Mass, returned June 5 from a two months trip to Europe.

Albion B. Peavey, vice president of the G. F. Wright Steel & Wire Co., Worcester, Mass., sailed June 9 for a two months trip to Europe.

Fred Rolfe has resigned as purchasing agent of the Koehler Mfg. Co., Marlboro, Mass., to engage in business for himself.

Clarence J. Pagel, district sales manager of Cleveland, of the Ohio Electric & Controller Co., Cleveland, resigned from that company June 15.

Harry A. Saunders was recently appointed district sales manager of Cleveland, of the Ohio Electric & Controller Co., Cleveland, succeeding C. J. Pagel who resigned June 15.

Dr. W. F. M. Goss, president of the Railway Car Manufacturers association, has been appointed to the John Fritz medal board of award, according to the American Society of Mechanical Engineers.

Paul G. Leoni, managing director of the Iron & Ore Corp., New York, sailed for Europe on the ROTTERDAM June 16. Mr. Leoni will be away for at least two months.

Charles M. Schwab had conferred upon him the honorary degree of Doctor of Laws by St. Francis college at Loretto, Pa., June 14. Mr. Schwab graduated from the college in 1881.

Fred H. Marsh, formerly with the Pittsburgh-Des Moines Steel Co., Des Moines, Ia., has accepted a similar position with the Paxton & Vierling Iron Works, Omaha, Nebr.

Daniel W. Gurnett, president of the Economic Machinery Co., Worcester, Mass., has been elected a voting trustee of the Elder Mfg. Co., St. Louis, succeeding the late Arthur C. Wright.

Gilbert Drysdale, for the past five years a foreman for the H. B. Smith Co., Westfield, Mass., has resigned to become superintendent of the Plainfield Foundry Co., Plainfield, Conn.

Clinton S. Marshall, district manager of the American Steel & Wire Co., Worcester, Mass., has been re-elected a trustee of the Worcester Polytechnic Institute.

F. H. Guppy, who for nine years has been associated with the Moltrup Steel Products Co., Beaver Falls, Pa. as secretary and sales manager, has tendered his resignation. Mr. Guppy's plans for the future are undecided.

Frank M. Spitz, secretary and treasurer of The Brown Fence & Wire Co., Cleveland, will sail for Italy July 20. Mr. Spitz leaves on the CONTE ROSSO from New York and plans to spend several months in touring through Italy.

Fred F. Ward, assistant sales manager, the Moltrup Steel Products Co., Beaver Falls, Pa. manufacturers of cold drawn steel, has been appointed sales manager succeeding F. H. Guppy who recently resigned as secretary and sales manager.

J. C. Agnew, who recently established the firm of Agnew, Batteiger & Co., Widener building, Philadelphia, for the

purpose of dealing in pig iron, ores, fuel, and other raw materials, has arrived in London for the purpose of studying European sources of raw materials for the American iron and steel industry. After investigating conditions in Great Britain, Mr. Agnew expects to proceed to Sweden and other parts of the continent.

Walter J. Kohler, president of the Kohler Co., Kohler, Wis., for the third time has been elected chairman of the board of regents of the University of Wisconsin.

H. A. Schaup of Johnstown, Pa., has been appointed assistant to W. W. Welsh, superintendent of the open-hearth department of the La Belle works of the Wheeling Steel Corp., Wheeling, W. Va., and has entered upon his duties.

C. F. Fay, formerly connected with the New York office of the Eastern Steel Co. as sales agent and in other capacities since January 1905, recently purchased the iron and steel business of Abeel Bros., 190 South street, New York, of which he will be in active charge.

H. D. Baker has been appointed representative in Michigan for the Roller-Smith Co., New York, and will handle the sale of the company's line of instruments, circuit breakers and radio apparatus in that territory. Mr. Baker has been connected with the Roller-Smith company in various capacities for several years.

P. J. Freeman has been appointed consulting engineer and technical adviser by the Standard Inspection Co., Pittsburgh, on all the company's contracts relating to concrete materials and construction, testing of power plants, pumping machinery and special machinery. Mr. Freeman will occupy offices at the company's headquarters.

William Whigham, vice president of the Carnegie Steel Co., Pittsburgh, has been elected a member of the executive committee of the citizens' committee on the city plan of Pittsburgh, it was announced recently. During the last year he served as chairman of the citizens' committee's sub-committee on waterways.

W. B. McCracken has been placed in charge of the Chicago offices of the Champion Engineering Co., Kenton, O., recently opened at 431 South Dearborn street, in that city. Mr. McCracken has had many years experience in the crane business and until recently was connected with the operating department of the Champion company.

Stephen Moltrup of Beaver Falls, Pa., has retired as president of the Standard Gauge Steel Co., and Frederick N. Beegle, president of the Union Drawn Steel Co., of Beaver Falls, was elected to succeed him. Samuel Hanna will succeed Walter Moltrup as vice president, and Herbert May is the new treasurer. Stephen Moltrup was one of the founders of the Standard Gauge company, and a member of the original board of directors. Mr. Moltrup is treasurer of the Moltrup Steel Products Co. and will devote his entire time to that company.

H. C. Smith, former president of the Allith-Prouty Co., Danville, Ill., it is understood will head the new company which is being formed to operate the foundry of the Moline Plow Co., at East Moline, Ill., which recently was acquired by Chicago and Danville interests. Mr. Smith in addition to being a former president of the Allith-Prouty company, also is a former president of the Danville Foundry Co. Other members of the company being organized are O. J. Failing, Frank Mancan and E. M. Richardson, all formerly connected with the National Malleable Castings Co., Chicago, in executive capacities.

R. E. Bebb, for more than 15 years president and general manager of the Canton Stamping & Enameling Co., Canton, O., recently resigned that position to become chairman of the board of directors of the company. Mr. Bebb is president of the Central Steel Co., Massillon, O., and an officer in a number of organizations in the Canton, O., district. He has been succeeded as president of the Canton company by H. T. Bebb. Other officers appointed are: First vice president and manager, W. B. Moore; vice president, Fred H. Snyder; sales manager, R. B. Geiger; secretary and treasurer, E. F. Hoerger and assistant secretary and treasurer, Sherman L. Gueutal.

Guilliaem Aersten, the newly elected president of the American Society for Testing Materials, long has been active in the iron and steel industry. In January 1876 he entered the employ of the Midvale Steel Works at Nicetown, Pa., remaining with that company until the fall of 1887 when he resigned as superintendent to take charge of the open-hearth and plate mill departments of the Homestead works of Carnegie, Phipps & Co., Ltd. The following year he resigned this position to become general manager of the newly organized Latrobe Steel Co., in charge of construction and operation, which position he held until after the sale of the company's Latrobe plant to the Railway Steel Spring Co. In March, 1911, Mr. Aersten returned to the Midvale company where he has remained in various capacities. Since the purchase of the Midvale Steel & Ordnance Co. by the Bethlehem Steel Corp., he has been attached to the Chicago office of the latter company as a member of the sales department.

Charles G. Dubois, New York, president of the Western Electric Co., has been elected a trustee of Dartmouth college.

Charles F. Rockwell, president and treasurer of the Miller Bros. Cutlery Co., Meriden, Conn., and Marcus H. Holcomb, Southington, Conn., a director of several manufacturing companies in that state, sailed June 23 on the MAJESTIC for a European trip.

W. H. Hans has been made district manager in charge of the offices of the Whiting Corp., Grindle Fuel Equipment Co. and Swenson Evaporator Co., Harvey, Ill., associated industries, with offices at 1526 Jefferson County Bank building, Birmingham, Ala.

A. E. Strafer, formerly sales manager for the Graves Machinery Exchange, Jersey City, N. J., now is connected with the Industrial Plants Corp., New York, in the same capacity. M. E. Arenwald again has become connected with the Industrial Plants Corp.

James A. Galligan, assistant to the president of the By-Products Coke Corp., Chicago, and George E. Haskins, of the purchasing department of the International Harvester Co., have resigned their positions and July 1 will become vice presidents of W. H. Harris & Co., Fisher building, Chicago, dealers in coal and coke. The firm now is W. H. Harris, Inc., the name being changed on the admission of the new members of the firm. Mr. Haskins is a graduate of Michigan university, 1905, and after three years in the wholesale grain business in Bellingham, Wash., he entered the employ of the International Harvester Co. Mr. Galligan was associated with Pickands, Brown & Co. from 1906 to 1920, devoting his efforts principally to the sale of Solvay coke. He then became assistant to President Clifford D. Caldwell of the By-products Coke Corp., in charge of sales. During the war he was in charge of coke distribution in the west for the fuel administration. Previous to 1906 he was with the purchasing department of the Allis-Chalmers Mfg. Co., Milwaukee, being assistant general purchasing agent at the time of his resignation. He is a member of the coal and coke committee of the American Foundrymen's association and has been active in the Chicago Foundrymen's club. David L. Ward, general manager for the By-Products Coke Corp., will remove his offices from the plant to the McCormick building and assume a portion of Mr. Galligan's duties.

Foreign Demand

Heavy on Motor Fuel—Sulphate of Ammonia Market Easier

New York, June 26.—Improved demand is adding considerable strength to the market on motor fuel and light oil distillates, although prices are unchanged. An unusually good demand is noted from abroad, particularly for motor fuel. Sulphate of ammonia on the other hand is slightly easier. Seasonal buying is ended and little is noted in the way of spot business. While $3.10 to $3.15 works is the generally accepted market on spot sulphate of ammonia for domestic account, it appears likely that this range could be shaded. The market on foreign shipments continue to hold nominally at $3.45 to $3.50 port, in double bags.

Quotations on light oil distillates are as follows: Pure benzol, 27 cents works in tanks, and 32 cents in drums; 90 per cent, 25 cents in tanks and 30 cents in drums; toluol, 30 cents in tanks, and 35 cents in drums; solvent naphtha, 27 cents in tanks, and 32 cents in drums; and commercial xylol, 29 cents in tanks and 34 cents in drums.

The market on ball and flake naphthalene continues easier, although prices are still holding around 9½ cents works for flakes and 10½ cents for balls, in carload lots.

Coke Oven By-Products

Spot

Per Gallon at Producers' Plants in Tank Lots

Pure benzol	$0.27
Toluol	0.30
Solvent naphtha	0.27
Commercial xylol	0.29

Per Pound at Producers' Plants

Phenol	$0.28
Naphthalene flake	0.9 ⅛
Naphthalene balls	0.10½

Per 100 Pounds at Producers' Plants

Sulphate of ammonia	$3.10 to $3.15

Contract

Pure benzol	$0.27
Toluol	0.30
Solvent naphtha	0.27
Commercial xylol	0.29

Per Pound at Producers' Plants

Phenol	$0.28
Naphthalene balls	0.10½
Naphtthalene flake	0.9 ⅛

Export 34 Locomotives

Washington, June 26.—Domestic exports of steam and electric locomotives in April totaled 34, of which number 11 were steam and 23 were electric, according to figures of the bureau of foreign and domestic commerce, department of commerce. Of the steam locomotives, seven were shipped to Canada, one to Poland, one to Guatemala, and two to Columbia. Three electric railway locomotives were shipped to Spain as were three mining and industrial engines. Japan received 12 industrial locomotives, British South Africa three, and England and Mexico, one each.

Output of Beehive Coke Shows Decline

Washington, June 26.—The production of beehive coke declined somewhat in the week ended June 16, according to the geological survey. Using as a basis the number of cars loaded, the total output is estimated at 390,000 net tons. Compared with the 406,000 tons produced in the week preceding, this was a decrease of nearly 4 per cent. The reduction occurred principally in Pennsylvania and Ohio. The comparative weekly production figures follow:

	Week Ended June 16, 1923(a)	Week Ended June 9, 1923(b)	Week Ended June 17, 1922
Pennsylvania and Ohio	316,000	330,000	75,000
West Virginia	20,000	22,000	7,000
Alabama, Kentucky, Tennessee and Georgia	24,000	23,000	9,000
Virginia	15,000	15,000	6,000
Colorado and New Mexico	8,000	10,000	6,000
Washington and Utah	7,000	6,000	3,000
United States total	390,000	406,000	106,000
Daily average	65,000	68,000	18,000

(a) Subject to revision. (b) Revised from last report.

Bituminous coal output continues fairly heavy and for the week ended June 23 the production is estimated at slightly under 10,800,000 tons.

Ship Ore to Philadelphia

New York, June 26.—Due to recent dredging operations in the Delaware river, the Bethlehem Steel Corp. again is using the port of Philadelphia for importing iron ore. The company recently unloaded at the Pennsylvania railroad's Girard point terminal, 12,000 tons of Cuban ore which represents the first cargo it has sent to Philadelphia in more than two years.

Wire Company Increases

The G. F. Wright Steel & Wire Co., Worcester, Mass., has increased its capital stock from $250,000 to $700,000. Its new mill, which will cost about $250,000 with machinery and equipment is expected to be partially occupied in August and in full operation by September or October. It will give the company 58,500 feet of floor space greatly increasing the space available for productive purposes.

Consumers Delay

Calling For Refractories Shipments—Orders Continue Good

Pittsburgh, June 26.—Present demand for refractories is on a somewhat lower scale than recently was the case. Most consumers, endeavoring to cut down their inventories, are utilizing their shed stocks for the time being and are not calling for shipments so freely on the brick they have under order. Good order books, however, are the rule and production keeps up to 75 or 80 per cent of capacity, and could be higher but for the existant labor shortages. Orders recently were above kiln capacity and now they are about equal to it. While new business is scarce, a few orders for 50,000 to 200,000 brick at a time for repair or filling in purposes are noted. Little new construction is going ahead at present. The West Penn Power Co. still is considering bids for the 600,000 fire clay brick wanted for boiler settings at Springdale, Pa.

Prices on fire clay are unchanged but in connection with silica brick concessions lately have appeared under competition from smaller makers, and one or two larger producers have lowered their price $1 or $2 per thousand accordingly. Pennsylvania silica cannot be quoted at above $45 to $47 although some $43 and $44 prices are circulated by isolated makers on small quantities. Magnesite and chrome brick are unchanged at $65 and $50, respectively. One interest reports orders for 50,000 on the latter including a few magnesite brick at the full market prices. Brick makers generally report an excellent car supply.

Refractories

FIRE CLAY BRICK
(Per 1000 f.o.b. works)

Pennsylvania, No. 1	48.00 to $1.00
Pennsylvania, No. 2	43.00 to 46.00
Ohio, No. 1	45.00 to 47.00
Ohio, No. 2	40.00 to 43.00
Illinois, No. 1	48.00 to 50.00
Illinois, No. 2	45.00 to 47.00
Kentucky, No. 1	45.00 to 47.00
Kentucky, No. 2	40.00 to 42.00
Missouri, No. 1	43.00 to 45.00
Missouri, high grade	45.00 to 53.00
Maryland, No. 1	50.00 to 53.00
Maryland, No. 2	44.00 to 47.00

SILICA BRICK

Pennsylvania	$45.00 to 47.00
Chicago	52.00 to 54.00
Birmingham	48.00

MAGNESITE BRICK
(Per Net Ton Seaboard Base)

9 x 4½ x 2½	$65.00

CHROME BRICK
(Per Net Ton)

9 x 4½ x 2½	$50.00

A strike of about 100 molders at the Saco-Lowell shops has practically closed the foundry at Lowell, Mass.

New Intercoastal Rates Named

Westbound Conference's Schedule Increasing Tariffs on Iron and Steel Products an Average of 25 Per Cent Adopted by Sixteen Steamship Lines— Some Contracting at Former Level Reported

LOS ANGELES, June 23.—A new schedule of intercoastal freight rates on iron and steel products has been announced by the westbound conference of steamship interests. The new rates, agreed upon at a recent meeting in New York, are effective Aug. 1. Sixteen steamship lines have adopted the new rates. It is understood that the American-Hawaiian Steamship Co. has extended all its present contracts to cover shipments made from mills up to and including July 31.

What effect, if any, the entry of the Transmarine Corp., into the intercoastal trade will have upon the new rates announced by the westbound conference remains to be seen. The trade here has been informed that this new company, operating out of the port of Newark, with 13 vessels, is contracting for the balance of the year at a rate of 30 cents per 100 pounds, though confirmation of this has not been obtained as the company as yet has not named its Pacific coast agents.

The following rates on 100 pounds of material as announced by the westbound conference apply on carloads only; rates on less than carloads and minimums to be announced later. They represent an increase of about 25 per cent. The rate on cast iron pipe still is under consideration.

Bands, bars, including corrugated or twisted, hoops, rods threaded or not threaded, slabs up to and including 6 inches in width, steel strip $0.40

Beads, corner; flooring, expanded metal; lathing, bituminized paper, metal reinforced; lathing, woven wire, corrugated, perforated or expanded; reinforcement, metal concrete N. O. S.; studding, iron..... 0.60

Belting, link; buckets, elevator, cast iron; castings; chain; chain, including chain shackles, N. O. S..... 0.45

Billets, blooms, ingots, muckbars..... 0.40

Bolts; bolts, lag; nutlocks; nuts; rivets, galvanized or plain, japanned or tinned or coated with copper, brass or bronze; screws, lag; washers 0.40

Calks, toe; shoes, horse or mule or ox (in kegs) 0.40

Castings, N. O. S., as from mold, except being cleaned and drilled with bolt holes and dipped to preserve from rust, not machine-finished; clevises; forgings, N. O. S., not further finished than being drilled with bolt holes; molds, ingot; wheels, sprocket N. O. S. as from mold except being cleaned and drilled with bolt holes and dipped to preserve from rust, not machine-finished..... 0.50

Ends, boiler, flanged or unflanged; heads, boiler, flanged or unflanged; plate and sheet (United States standard gage No. 11 or thicker) black, galvanized, long terne (coated with composition of lead and tin), or corrugated, bent or not bent, punched or not punched.... 0.40

Sheets or plates (United States standard gage Nos. 12 to 16 inclusive) black, galvanized, long terne (coated with composition of lead and tin), or corrugated, not bent or punched..... 0.50

Sheets (United States standard gage No. 17 or thinner), black, galvanized, long terne (coated with composition of lead and tin), or corrugated (but exclusive of planished or russia), not bent or punched..... 0.60

Corrugated iron, No. 17 gage or thinner, flashings; ridge rolls 0.60

Ferromanganese, ferrosilicon, spiegeleisen 0.40

Pig iron 0.35

Flues, boiler, not over 12 inches; pipe (other than coils) wrought iron or steel, butted, brazed; welded or seamless, not enameled, up to 12 inches in diameter and 20 feet in length 0.45

Same, 20 to 40 feet in length..... 0.55

Same, over 12 inches diameter, 2½ cents per 100 pounds for each additional inch or fraction thereof.

Nails, spikes, wire, etc., viz.: Dowel pins, iron or steel; Fasteners, hoop in boxes; fasteners, sheet, roofing, iron or steel; guards, stay; hoops, wire; nails, cement coated; nails, cut or wire, N. O. S., in kegs; posts, fence, except ornamental or architectural; spikes (not including railroad, ship or boat spikes), cut or wire, N. O. S., in kegs; staples; stretchers; wire, iron or steel, acid coppered, galvanized, painted, plain or tinned, in bundles, coils or on reels; wire, iron or steel, acid coppered, galvanized, painted, plain or tinned, thickness not exceeding ½-inch, in straight lengths; wire, iron or steel barbed, galvanized or painted; wire, strand, iron or steel, not exceeding ½-inch in thickness, in bundles, coils or on reels.. 0.40

Nails, horseshoe, in boxes..... 0.40

Pipe fittings or connections, including: Bends, pipe, wrought iron, with or without wrought or cast iron flanges; cocks, iron body; cocks, wrought, cast, or malleable; connections, pipe, the bodies or principal parts of which are iron, but having brass or other metal pieces or parts; couplings, pipe, with bolts for same; iron gates, water; hydrants, fire; nipples, wrought, cast, or malleable; plugs, fire; valves, the bodies or principal parts of which are iron, but having brass or other metal pieces or parts; valves, including wrought, cast or malleable valves; the foregoing with threaded, flanged or hub ends; up to 12 inches diameter..... 0.45

Same descriptions: 2½ cents per 100 pounds for each additional inch or fraction thereof over 12 inches diameter.

Plates, shapes and bars, bent or not bent, punched or not punched, viz.: Angles; bars; beams; channels; plates, 11 gage and heavier; covers unfabricated steel only. Rate applies on lengths up to 35 feet only. Add 10 cents for pieces 35 to 60 feet; over 60 feet, special arrangement 0.40

Structural iron and steel, fabricated, consisting of angles; bars, including corrugated and twisted bars; bars, truss; bases, post cap; beams; bolts, not including carriage, wagon, machine or lag bolts; braces; cap, post; channels; columns; elevator guides and fish plates and bolts for same, in straight carloads only; frames, circular; girders; hangres, joist; nuts; piling; plate, United States standard gage No. 11 and thicker, punched or unpunched, bent or not bent; plates and sheet, United States standard gage No. 16 and thicker, corrugated or not corrugated, bent or not bent, punched or not punched;; plates, sidewalk and floor, without glass; pulleys, tank or reservoir; railing, bridge; rails; rivets, not less than ⅜-inch in diameter; rods; shoes, riveted or cast; tees; trusses; tubing, pier; turnbuckles; washers; weights, not including sash weights; zees. Rate applies on lengths up to 35 feet only. Add 10 cents for pieces 35 to 60 feet; over 60 feet, special arrangement 0.55

Rails, steel; rails, mining; ties, cross, steel; track, saw mill; up to 36 feet..... 0.40

Same, 36 to 60 feet 0.50

Same, over 60 feet, special arrangement.

Bars, angle; bars, fish; bars, splices, rail joint; bars, welder; blocks, filler; bolts, track; braces, rail; chairs, rail; creepers, antirail; fastenings, steel clip, for steel ties; fillers, frog; fillers, rail joint; joints, rail; locks (nut), track; nuts, track; plates, base; plates, tie; rods, tie; spikes, track; washers, track.... 0.40

Tin plate in strapped cases..... 0.40

Platinum Output Gains

Washington, June 26.—Production of platinum and allied metals in 1922, totaling 57,718 troy ounces registered a slight gain over the output of 1921 when the total was 56,370 troy ounces. Imports of platinum metals into the United States gained from 78,235 troy ounces in 1921 to 83,337 troy ounces in 1922. The total consumption of platinum metals in the United States in 1922 was 181,498 troy ounces, an increase of about 3 per cent as compared with the total consumption of 176,148 troy ounces in 1921.

Japanese Works Begin To Make Tin Plate

Washington, June 26.—The Japanese government's iron works at Yawata has begun the manufacture of tin plate according to press notices forwarded to the department of commerce by Consul H. B. Hitchcock, Nagasaki. As an adequate supply of tin has not been received full capacity production cannot be undertaken. At present the Yawata product is inferior to imported tin plate due to an inability to turn out iron sheets of a uniform thickness without flaws or cracks. It is believed, however, that in time and with the greater experience of the workmen this drawback will be overcome and the product brought up to a standard to compare with imported tin plate. The experience of tin plate manufacturers in other countries is being put to use in bringing the quality of product on a basis which offers competition to foreign tin plate.

Estimates of the stock of steel materials in Japan at the end of March, 1923, made by the Mitsui Bussan Kaisha, together with the February stocks which are enclosed in parentheses, are: Bars, 31,027 long tons (31,243); plates and sheets 24,667 (29,539); shapes, 13,713 (14,509); galvanized sheets 3424 (4160); tin plate 2427 (2654); wire nails 5343 (4955); wire, 9896 (11,693); rails 8896 (2640); other products 1858 (1592).

Developing Ore Property

The Alabama Co. is developing iron ore property in Etowah county, within a short distance of its two blast furnaces and its coal mines near Birmingham. A mine has been opened at Mary Lee, 10 miles from Birmingham, from which it ultimately is planned to obtain about 1200 tons of ore daily. The company also is developing its shale beds near Mary Lee, selling the product to a cement manufacturer.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

SINCE putting the Steinbart-type burner on the market in August, 1922, the American Heat Economy Bureau, 826-828 Wabash building, Pittsburgh, has received and filled the following orders: Wheeling Steel Corp., Steubenville, O., five 800-horsepower boilers, seven 500-horsepower boilers, and eight stoves; Shenango Furnace Co., Sharpsville, Pa., four stoves; Bethlehem Steel Co., Sparrows Point, Md., two 1200-horsepower boilers and two 400 horsepower boilers at the Lackawanna plant. In addition to these other installations operating or in course of construction are the National Tube Co., Lorain, O., 24 stoves, six 1500-horsepower boilers and seven stoves at the McKeesport, Pa. plant; Donner Steel Co., Buffalo, three 800-horsepower boilers.

* * *

FULL operation of the Bernard Boiler Co., Lima, O., which was moved from Elyria, O., started June 6. Operation was started on the basis of 1000 boilers per year. J. P. Bernard, designer of the boiler is president of the company.

* * *

ANNOUNCEMENT has been made by the Lebanon Gear & Machine Works, Lebanon, Pa., that the general machine and gear cutting equipment of this company has been sold to the Johnson-Weaver Chain Co. The latter company will continue in the machine and gear business.

* * *

STOCKHOLDERS of the Defiance Machine Works, Defiance, O. have voted favorably on the reorganization plan approved by Federal Judge Killits of Toledo. The plan provides for the issuance of $600,000 bonds through the Richardson Trust Co., Toledo. E. M. Hummer is receiver for the company.

* * *

ANNOUNCEMENT has been made of the completion of the first unit of a series of buildings for the Emsco Steel Products Co., Los Angeles, Cal. at a cost of $500,000. The factory when completed will be devoted to the exclusive manufacture of oil well specialties. The company is a branch of the E. M. Smith Co., manufacturers of asbestos brake lining and rubber belting. The new building will house a machine, structural and forge shop.

* * *

MEETING of the stockholders of the Carroll Foundry & Machine Tool Co., Bucyrus, has been called for July 12. At this time a vote will be taken on the proposal to change the name of the company to the Bucyrus Road Machinery Co. and to increase the capital by $200,000 preferred and 15,000 shares of par common stock.

* * *

PROPERTY has been leased for the construction of a plant at the corner of Marion avenue and East Twenty-second street, Cleveland, to be used by the Klein & Patterson Body Co. The building to be built will be 81 x 203 feet and will be used in the manufacture of truck bodies. The building will be constructed at a cost of about $50,000.

* * *

A FLOATING dry dock, in two sections, each 60 x 600 feet, and costing $300,000, will be built for the Green Bay Dry Dock Co., Green Bay, Wis., by William F. Donnelly, mechanical and structural engineer, 17 Battery place, New York. Plans will be completed about July 1 and the engineer will take bids on the various divisions of the work, including the equipment.

* * *

WORK has been started at Burlington, Wis., on the first unit of a community manufacturing building, the first lessee of which will be the Sanitary Dishwashing Machine Co., at present located at 383 Tenth street, in Milwaukee. A Milwaukee shoe factory will occupy the remainder of the building with a branch. The structure is 90 x 120 feet, two stories high.

* * *

THE Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., has received several contracts from the war department involving more than $500,000. This is the largest order which this company has received from the government since the peak of production in the late war. The order calls for a variety of products which will be used to complete surplus stores, kept available for use in any possible emergency and will mean from six to nine months work.

* * *

LUCIUS ROSSITER, formerly secretary and treasurer of the Terry Steam Turbine Co. Hartford, Conn., has been elected vice president and treasurer, and Raymond L. Thomson, general sales manager, has been elected secretary. Douglas H. Thomson was re-elected president at the annual meeting held June 11, as were the following directors: E. B. Bennett, D. H. Thomson, J. L. Howard, F. E. Howard, N. D. Prince, Lucius Rossiter and Shiras Morris.

* * *

PERMISSION has been granted the Alabama Power Co. to develop an immense hydroelectric plant at Cherokee Bluffs on the Tallapoosa river, southeast of Birmingham, at which place ultimately 130,000-horsepower will be generated. Work is to be started on the project in the near future, this work when completed to cost upward of $10,000,000. The Alabama Power Co. has hydroelectric plants on the Coosa river, steam plants at Gorgas, Gadsden and elsewhere and leases the steam plant at Muscle Shoals from the government.

* * *

HAMPTON ROADS Iron Works Co., Inc., has been organized to take over the property of the former Newport News Iron Works, Newport News, Va. The company will succeed the former owners of the property in the general machine shop and ship repair business. W. J. Nelms is president of the new corporation, L. A. McMurran, vice president and W. B. Colonna secretary and treasurer. The capital is listed as maximum $25,000 and minimum $10,000. The board of directors is composed of the officers of the company.

* * *

MANUFACTURE of motor trucks on a quantity scale will be resumed July 1 by the Parker Motor Truck Co., Milwaukee, which has undergone a reorganization following the death of Frank H. Parker, who was president and treasurer. A new corporation of same name, with a capital

of 2000 shares of non-par stock has been organized under the laws of Wisconsin. John E. Tracy, vice president and general manager of the former company, is in charge. The factory and offices are at 606-624 Linus street, Milwaukee.

* * *

ELGIN Motors, Inc., has succeeded to the business of the former Elgin Motor Car Corp., Argo, Illinois. The Elgin Motors, Inc., will manufacture a new Elgin car at 323 West Fifteenth street, Indianapolis. J. H. McDuffee is president of the new company.

* * *

OFFICERS have been elected as follows by the Orton & Steinbrenner Co., 608 South Dearborn street, Chicago, manufacturers of locomotive cranes, dipper shovels and grab buckets: President and general manager P. A. Orton; vice president E. B. Ayers; secretary and sales manager, Herbert Mertz; treasurer, Harry Shaffer. The reorganization was occasioned by the resignation of H. G. Steinbrenner as president and the disposal of his interest in the company.

* * *

THE Pelton Water Wheel Co., San Francisco, will erect a 2-story office and factory, 150 x 200 feet on property located at Nineteenth and Harrison streets. The new building will house the office, drafting room, pattern shop, pattern storage and pump assembly departments. The removal of these departments from the present building will allow more space to be devoted to the machine shop and the turbine erection departments, and practically will permit the doubling of present facilities. A number of additional machine tools will be installed.

* * *

IN ADDITION to the 1400 tons of 12 to 24-inch cast iron pipe ordered by Homestead, Pa., from the United States Cast Iron Pipe & Foundry Co., other contracts were let to permit the borough to obtain its water from a main of the Pittsburgh water system at Glenwood. The valves went to the Ludlow Valve Mfg. Co., Williamsport, Pa., and other contracts were awarded the Pitt Construction Co., Pittsburgh and the Monongahela & Ohio Dredging Co., Pittsburgh. Approximately $154,000 was involved in the total expenditure.

* * *

GROUND for a new truck factory was broken several weeks ago in Johnstown, Pa., the foundation and cement floor has been laid and work on erection will commence on delivery of steel. This plant which is being erected for Adam Trabold at a cost of $75,000 will be located along the Baltimore & Ohio railroad tracks at Clay street and Ferndale avenue, 90 x 220 feet. Mr. Trabold commenced to make trucks on Railroad street, that city about 10 years ago and the growth of the business has made this expansion necessary.

* * *

A 50-foot extension to the machine shop of the Aetna Foundry & Machine Co., Warren, O. has been completed to keep abreast of the company's increased tinning and galvanizing equipment business. Recent shipments of galvanizing units made by the company include two to England, one to Japan, and one to the Sparrows Point plant of the Bethlehem Steel Co. Orders now going through the shop of the Aetna company include a complete galvanizing installation for the Canonsburg Steel & Iron Works, Cannonsburg, Pa. and pickling and galvanizing equipment for the new sheet steel plant of the Metal & Thermit Corp., South San Francisco, Cal.

* * *

ORGANIZATION of the Dominion Radiator & Boiler Co. Ltd., Toronto, Ont. has been completed, the new company having a capital stock of $3,500,000. This company will take over the plants of the Dominion Radiator Co., Toronto and the American Radiator Co. of Canada, Ltd., with plant at Brantford, Ont. The entire assets and liabilities of the two companies have been acquired by the new company whose office will be located at Toronto. H. N. Leadbetter, formerly of the American Radiator Co., is president of the combined organization. The directors of the Dominion Radiator Co., while retaining stock interests in the new company, are retiring as directors and the new company will be under the direction of the American Radiator Co.

* * *

PURCHASE of the foundry of the Moline Plow Co., at East Moline, Ill., by a group of Chicago and Danville, Ill., interests recently was announced. A company now is being formed to operate the plant of which H. C. Smith, former president of the Allith-Prouty Co., Danville, will be president. Operations will be started in the plant within 90 days it is understood and approximately 1000 tons of malleable castings will be produced monthly. The plant, was erected in 1920, and is very well equipped. Casting equipment is on the second floor and annealing rooms on the ground floor. In addition to Mr. Smith, O. J. Failing, Frank Mancan and E. M. Richardson, all formerly connected with the National Malleable Castings Co., Chicago, are interested in the company being formed to operate the plant.

* * *

THE Forse Machine Co., Anderson, Ind., operated by Donald Forse, Earl Kingsley and W. H. Forse Jr., has taken possession of the property purchased by W. H. Forse Jr. from Frank P. Foster several months ago. Die-casting machines have been installed and the plant now is in full operation. Additional die-casting machines will be built and put into operation as required.

* * *

AT RECEIVER'S sale, the real estate of the Clinton Stove Co, Clinton, Ind, was sold to the former directors of the company, J. W. Robb, A. W. Hedges, Frank R. Miller, U. G. Wright, M. E. Nebeker, M. M. Scott. H. B. Pike and J. W. Pierce. No attempt will be made to revive the business, but the purchasers will plat the land as an addition. The price paid was $10,000. The personal property was sold to different parties and yielded $14,000. Receipts of the sale were not sufficient to discharge the debts of the company.

* * *

RECENT stoker equipment contracts awarded the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa, include the following: The Torrington Electric Light Co., Torrington, Conn., two underfeed stokers, including extension sidewall tuyeres, steam operated dumping mechanisms, steam-engines and chain drives, two 508-horsepower Bigelow boilers and other equipment; the Metropolitan Edison Co., Reading Pa., clinker grinders on two stokers; the Consolidated Light, Heat & Power Co., Kenova, W. Va., five complete sets of underfeed stoker line shafting and an underfeed stoker including steam dumping mechanisms and extension sidewall tuyeres; the Eastern Connecticut Power Co, Montville, Conn., eight furnace doors complete with angles in connection with two new model multiple retort underfeed stokers and two 984-horsepower boilers; the Norfolk & Western railroad, Bluestone, W. V., two underfeed stokers with extension sidewall tuyeres and new type air distributing boxes; the Madison Gas & Electric Co., Madison, Wis., an underfeed stoker unit including hollow blast dump grates, line shafting, hangers, couplings, etc, and the Onondaga Pottery Co., Syracuse, N. Y., an underfeed stoker.

Midvale Co. Reorganized

OFFICIALS AND STAFF OF MIDVALE CO

Front row, left to right—A. C. Dinkey, president; J. M. Milliken, secretary and treasurer; Francis Bradley, general superintendent; Dr. H. L. Frevert, vice president in charge of operations. Back row, left to right—Radclyffe Furness, superintendent, melting and forge; Stuart Hazlewood, vice president in charge of sales; John L. Cox, assistant to general superintendent

REORGANIZATION of the Midvale Steel Co., under the name of the Midvale Co., has been completed, with Alva C. Dinkey as president, and the company is proceeding with the operation of its plant at Nicetown, Pa. There has been considerable interest in what steps the company would take since the Bethlehem Steel Co., recently acquired the plants of the Cambria Steel Co., and other subsidiaries of the Midvale Steel & Ordnance Co. other than the Midvale Steel Co.

The Midvale company has now laid plans for future commercial production, though it has not yet decided as to what will be done with the special equipment for making guns, armor plate and armor-piercing projectiles. The company hesitates to scrap this equipment on account of Midvale's long ranking prominence in this department of manufacture.

The company now is operating its various departments on a fair schedule in the production of forgings, tires, large and small rings, roll shells, large crank shafts, hardened and ground rolls, special designs of extrusion cylinders and liners, piston and hammer rods and forged members to withstand shock and fatigue. It also is producing, as a special product, large quantities of iron and steel castings, rough and machined, for nearby industries. There is an active increase in its business of carbon and high speed tool steels, and its purpose is to expand its tool steel output in the near future to include all analyses and sizes.

The company was a pioneer in locomotive tire manufacture in the United States. Its equipment for manufacturing tires consists of four mills, having a combined capacity of 12,000 tires per month, including plain, flanged and double flanged sections, from a minimum inside diameter of 13½ inches to the largest high speed passenger locomotive driving tires.

Large forgings, hollow as well as solid, will continue to be one of its chief products. The plant is equipped with ten hydraulic forging presses ranging from 10,000 to 500 tons in capacity. The 10,000-ton press will handle a 175-ton ingot and will take a 14-foot forging between columns. To serve the forging presses, the plant is equipped with 10 open-hearth furnaces, of which seven are 50 to 60 tons, two 35 tons, and one 25 tons capacity. These furnaces are provided with a complete equipment of special ingot molds to produce ingots ranging in size from 1000 to 350,000 pounds. A 6-ton heroult electric furnace also is used for making electric steel either from cold scrap or from metal melted in the open hearth.

The company specializes in the production of large and unusual forgings in any grade of steel, to specification. The plant has eight large machine shops. These include one tire machine shop, a slicing shop, two roughing shops and four shops for general finished machined work. It also has iron, steel and brass foundries principally for the production of large castings to go along with its forgings.

The plant retains its old organization, trained at the Midvale plant and in control of its various departments for many years.

In charge of the plant is Dr. H. L. Frevert, who started with Midvale about 15 years ago after graduating from Harvard university. The company will continue to conduct research work under the supervision of Dr. Frevert and John Lyman Cox, co-operating with the engineering departments of builders of large units of various kinds and in meeting special forging requirements.

The complete list of officers and directors of the reorganized company follows: Alva C. Dinkey, president; Dr. Frevert, vice president; James M. Milliken, secretary and treasurer; Stuart Hazlewood, vice president in charge of sales; J. Rutherford McAllister, president of the Franklin National bank; Samuel F. Pryor of New York; Samuel M. Vauclain, president of the Baldwin Locomotive Works and Joseph Wayne Jr., president of the Girard National bank.

Austria Obtaining Coke

Washington, June 26.—Trade Commissioner Upson at Vienna has cabled the department of commerce that the Alpine Montangesellschaft now has four furnaces in blast and is assured of a coke supply from foreign sources. Unfilled orders on June 6 totaled 26,000 metric tons. German and Zecho-Slovak competition has caused a 16 per cent reduction in pig iron quotations. The May output was 35,000 tons of pig iron, 36,000 tons of ingots and 27,000 tons of miscellaneous rolled steel products.

Obituaries

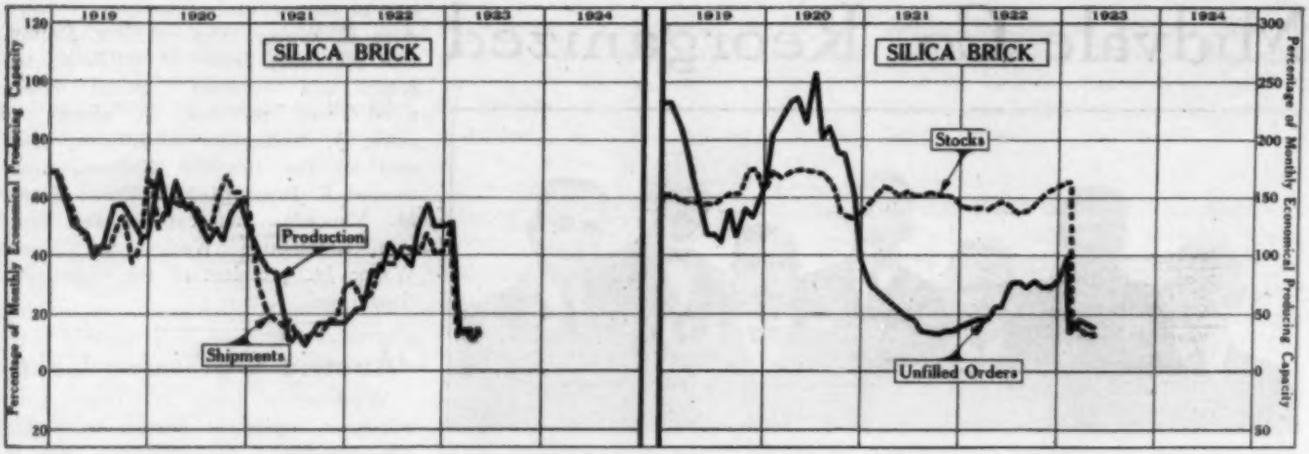
WALTER H. JENNINGS, aged 53 years, secretary-treasurer of the Murchey Machine & Tool Co., which he organized 12 years ago, died last week. Mr. Jennings had been ill less than two weeks.

John D. Merrill, secretary-treasurer of the E. R. Merrill Spring Co., New York, died June 18, following an operation. Mr. Merrill was 52 years of age and lived in New Rochelle, N. Y.

John P. Whelan, treasurer of the Western Foundry Co., Chicago, died recently at his home in that city. Mr. Whelan was formerly secretary of the Canfield Oil Co., and was a member of the South Shore Country club and the Cleveland Athletic club.

Arthur H. Brewer, for a number of years president of the former Hopkins & Allen Arms Co., and also vice president of the Crescent Fire Arms Co. who had been an official of several other manufacturing companies in Norwich Conn., died at his home June 19. He was 75 years old.

Lawrence S. Fuller, assistant treasurer of the Born Steel Range Co., Cleveland, died June 24 at his home in that city, following a 10 days illness resulting from an attack of inflammatory rheumatism, followed by a heart attack. He was 29 years old and for the past 10 years has been active in the automobile trade and manufacturing circles.



Relation Between Shipments and Production of Silica Brick

Fire Clay Production Holds Steady

COMPILATION of data contributed by the various members of the Refractories Manufacturers' association, reveal that during May production and shipments of fire clay brick were practically on a par with April, production registering 85 per cent in May as against 82 per cent in April, shipments registering 84 in May as against 83 in April. Silica brick production increased 10 per cent while shipments increased 13 per cent. Net new business in fire clay fell off from 84 to 67 per cent, while in silica, net new business increased from 38 to 42 per cent. Unfilled fire clay orders on the last day of May represented 136 per cent of capacity while on the last day of April, it stood at 153 per cent of capacity. Unfilled silica brick orders were 25 per cent less on May 31 than they were April 30. The sharp decrease in cancellations of fire clay brick shows the increasing firmness of the market for fire clay brick. Cancellations of silica brick were approximately the same at the end of May as at the end of the preceding month. The comparative figures in 9-inch equivalent on both grades follow:

FIRE CLAY

	May 31, 1923	April 30, 1923
Capacity reporting.....	75,341,977	74,921,727
On hand last day preceding month	151,313,259	150,776,923
Production	64,391,108	61,605,608
Shipments	63,511,279	62,171,363
On hand last day current month	152,193,088	150,211,168
New orders received during month	50,994,943	64,569,495
Cancellations	165,219	1,135,946
Net new business.....	50,829,724	63,433,549
Unfilled orders last day current month.....	102,869,510	114,908,328

SILICA BRICK

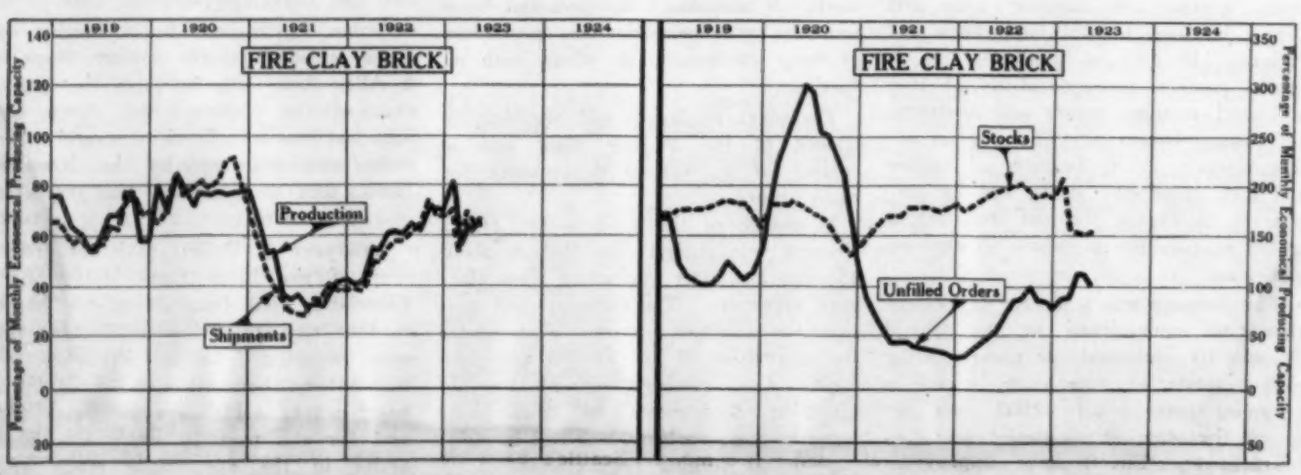
	May 31, 1923	April 30, 1923
Capacity reporting.....	22,565,500	22,297,167
On hand last day preceding month.....	36,055,506	34,815,292
Production	13,783,679	11,413,796
Shipments	14,878,632	11,727,514
On hand last day current month	34,960,553	34,501,574
New orders received during month	9,955,865	8,850,686
Cancellations	406,243	406,980
Net new business.....	9,549,622	8,443,706
Unfilled orders last day current month.....	37,892,944	43,075,659

The Geometric Tool Co., New Haven, Conn., has increased its capital stock from $100,000 to $1,000,000. It consists of 10,000 shares of preferred of a par value of $50 each and 20,000 shares of common of a par value of $25 each.

To Build Machine Tools

The Elk Mfg. Co., New York, has been taken over by the Elk Machine Tool Corp. with increased capitalization. The new company will continue to manufacture and sell all the precision tools formerly made by the Elk Mfg. Co. The new company will be located July 15 in their new plant at 243 West Seventeenth street, New York, which is being equipped with modern machinery for quantity production of precision tools, and will have direct representatives and branches located in about 25 cities of the United States.

The line of tools manufactured by the company consists of machine tools for shaving, burnishing and squaring bearings used in internal combustion motors, valve lifters, air compressors, etc. J. G. Elkin is president of the new company.



POSITION OF FIRE CLAY BRICK TO PRINCIPAL MARKET FACTORS

Northwest Business Satisfactory

Conditions in Metal Trades More Settled—Jobbers Realize Good Volume of Business in May—Lumber Industry Again in Full Swing Following Strike—Building Continues Brisk

Special Correspondence

SEATTLE, June 23.—Business in the Pacific Northwest continues to show satisfactory totals. The industrial tone is healthy and optimism is prevalent generally among manufacturers, business men and bankers. While there may be a slight midsummer lull in some branches of industry the prospects for an active fall movement are bright.

In the metal trades, conditions are practically unchanged from a month ago. The percentage of capacity in operation is well sustained. While possibly there is not the rush of work apparent in April the volume of business is satisfactory. The market shows no runaway tendency and conditions are more settled. The strike of mechanics in the metal trades has affected but a small proportion of foundries and metal plants. There is a shortage in some classes of skilled labor, especially molders, who, however, are not concerned in the present strike. It is generally suspected that the demand for increased wages at this time is a gesture intended for the benefit of government officials who are soon to survey wage conditions at the Puget Sound navy yard.

Jobbers are well satisfied with business in May which showed gratifying totals notwithstanding interruption in lumbering and logging and despite difficulties in getting orders delivered from Eastern centers. Strike troubles at San Pedro during May interfered with steamship services so that much tonnage has been delayed. Increased water rates are to become effective on the intercoastal route about Aug. 1, indicating that there will be heavy buying and a large volume of steel products moving from the Atlantic seaboard while present low rates are effective.

Demand Well Sustained

Demand is reported by jobbers to be well sustained for practically everything in stock. Some jobbers are finding themselves short because of delays in delivering new orders. Building materials, bars, plates, shapes, nails, spikes and practically everything in the catalog is showing a large turnover. Sheets have improved although a price cut on this item in Seattle, Tacoma and adjacent cities is said not to have stimulated buying to any extent. Otherwise prices have been stationary for several weeks being in line with Eastern quotations.

North Pacific marine repair plants have enjoyed an active spring season, several large steamer jobs having been completed. The Todd yards, Tacoma, have just completed and delivered the steamer ALASKA, the first steel passenger steamer ever built in Puget Sound waters. The same plant is finishing its contract with the United States navy for three scout cruisers. Wood shipyards have a considerable amount of small work at hand, this industry being much more active than a year ago.

Lumber Operations in Full Swing

In the lumber industry operations are again in full swing following an I. W. W. strike early in May. Employers are planning to eliminate the agitators and to adopt means to keep their woodsmen contented. High wages are being paid throughout the industry which has been on an 8-hour basis since the war. Production in Washington and Oregon is running between 90,000,000 and 100,000,000 feet per week, May's output having averaged 16 per cent above normal. New business ran below production and shipments averaged above new business. Lumber prices are firm and the demand continues from many quarters principally Japan, Australia and Southern California.

Building construction in the northwest continues brisk although the nationwide tendency to avoid excessive building costs is noticeable by the postponement of a number of large projects or the rejection of bids as above estimates. During the first five months of 1923 Seattle's building permits totaled $8,509,000 an increase of 13 per cent over the same months last year. It is estimated, that this year's record will be between $21,000,000 and $22,000,000 or $2,000,000 more than 1922 the city's best previous twelve months. Last month's building totals in Seattle were $1,867,280 compared with $1,643,000 in May 1922 while during the same two months Seattle's bank clearings increased approximately one-third from $103,410,732 to $150,710,810.

While Portland building permits for May show a slight loss over May 1922 the first five months of this year were 5677 permits totaling $11,090,770 as against 5967 permits costing $10,635,285. Buildings under construction at Astoria, Ore., destroyed by fire last December, will cost $696,000 and additional contracts for $165,000 have been awarded. This city has awarded a contract for $282,798 for a retaining wall protecting the business district. At Portland the United States national bank will erect a tower on its building giving a total height of 24 stories.

State records show that several hundred miles of new logging railroads are under construction tapping virgin growths of timber. Contract has been awarded at Aberdeen for a $500,000 hotel. The city of Seattle will award contracts for public works totaling $560,000 this month. Plans are being prepared for a $500,000 steel bridge authorized at a recent election.

Bids for the community Olympic hotel, Seattle, were opened recently, the lowest tender being $3,254,000, which is exclusive of the structural steel for the first four stories. This estimate is considerably above expectations but the promotors of the project have now decided to spend $5,000,000 instead of $3,000,000 as originally planned. Numerous construction projects, including warehouses, business blocks, apartment houses and community structures have been announced during the month. The port of Seattle has authorized improvements and extensions totaling $100,000.

States Payroll Increased

Statistics recently completed show that the state's industrial payroll for the first four months of 1923 totaled $2,975,900 showing an increase of 50 per cent over $1,909,700 for the same period 1922. In the same time steel factories and machine works registered a gain from $275,900 to $628,500. Panama canal figures show that the volume of iron and steel products moving from the Atlantic to the Pacific increased from 697,210 tons in 1921 to 1,376,202 tons in 1912.

Buying of Tools Continues Light

In the Main Sales Are Confined to Small Lots—Good Potential Market Indicated by Numerous Inquiries Being Brought Out—Dealers in Used Machinery Report Increase in Business for Week

INQUIRIES and sales of machine tools and shop equipment are fairly numerous, but are confined in the main to small orders. With three-quarters of the month gone, dealers state that the volume of sales for June will in no way compare with the business completed in May. The falling off of business in June in the main, may be attributed to the regular seasonal slump. While some inquiry is coming from the railroads, the bulk of the business is being done with the manufacturers. Some dealers report that specialized tools are featuring the majority of inquiries.

Several manufacturers have fair sized lists out. The Westinghouse Electric & Mfg. Co., is inquiring for 14 tools for the East Pittsburgh plant, and is still taking bids on 75 tools for the Sharon, Pa., transformer plant. The General Electric Co. is inquiring for several tools for its Schenectady, N. Y., plant. The boards of education of Pittsburgh, Boston, and Springfield, Mass., are inquiring for fairly large lists for technical high schools. While railroad buying has been rather light, the prospects for an increase in business in this department seem promising. The Atlantic Coast Line railroad has ordered its spring shop equipment. The Chicago & Northwestern, the Union Pacific and the Chicago, Rock Island Pacific railroads each have placed small orders. Five or six machines have been purchased by the New York Air Brake Co., Watertown N. Y. It is reported that the Nickel Plate railroad will not take action on its inquiry for two or three weeks. It is expected that the Canadian Pacific railroad will inquire soon for equipment for new shops.

A number of dealers in the used machinery market have reported increases in the volume of sales this week over the preceding week. However, the sales for June will be lighter than those reported during the month of May. Inquiries in the main are for single tools, and for the most part come from the manufacturer.

Machinery Demand Comes from Manufacturers

NEW YORK, June 26.—Machine tool buying in this district is restricted chiefly to small orders. The New York Air Brake Co. has closed on five or six machines for its plant at Watertown, N. Y., but orders of even this size are exceptional. Among miscellaneous orders are two car wheel borers for the Pennsylvania Castings Co., located near Philadelphia, a 36-inch planer for the Union Pacific; a 36-inch lathe for the Chicago, Rock Island & Pacific; a 30-inch lathe for the Edward Ford Plate Glass Co., and a 6-foot boring mill for the William R. Thropp Co., Trenton N. J. Railroad buying by eastern lines is featured by an order for spring shop equipment for the Atlantic Coast Line The Hallidie Machine Co., a Pacific coast concern, has closed on an 84-inch wheel press with an eastern builder.

While considerable business is pending, little in the way of fresh inqury is noted. The General Electric Co. continues an active factor, its latest inquiry calling for an 18-inch lathe and a milling machine for its Schenectady, N. Y., plant. This company is taking estimate figures on equipment for its proposed switchboard plant in South Philadelphia, but it is likely that no formal list will be issued for at least several weeks. The plant, on which general contractors' bids will be closed June 9, will consolidate the company's switchboard manufacturing operations at Baltimore, Philadelphia, and Schenectady. The company's present plant in Philadelphia, it is understood, will be used as a storage plant. At the time the propositon first came up, about two years ago, six 3-ton overhead cranes were figured on.

Calendar and Selected News of Plant Liquidations, Wholesale Offerings, Auctions of Used and New Equipment, Etc., Page 98, Classified Machinery Section.

Dealers of used equipment report business as fairly satisfactory, although not as active as two weeks ago. They describe this lull as seasonal. The machine tool market as a whole is firm, however. Outstanding in the crane market is the placing of nine electric overhead cranes by the General Electric Co., for its Schenectday, plant.

Demand Practically Unchanged

CLEVELAND, June 26.—Conditions in the machinery market can be expressed as practically duplicating those found during the preceding week. Although sales continue at a lesser rate than was experienced during the month of May, inquiries for tools in small lots are being released from time to time. Dealers feel that prospects for better business in the near future are good.

Many of the inquiries now before the dealers call for special machinery, in some cases the purchase being contemplated with the idea of increasing production. One manufacturer is asking for two special machines costing approximately $4000 each. The recent inquiry of the Toledo Chevrolet Motor Co., Toledo, O., calling for a number of gear grinding machines at a cost of $40,000, has been closed with the Barber-Coleman, Co., Rockford, Ill. It is reported that the inquiry of the Nickel Plate railroad calling for 14 to 18 tools, as reported last week, will not be closed for two or three weeks.

While a few of the dealers in used machinery report a falling off of business during the past week, the majority state that the volume of sales in this period shows a substantial increase over the business done during the preceding week. The increase in sales coupled with inquiries that are being brought out from time to time have augmented the cheerful feeling that was noted a week ago. The railroads continue to come into the market for a few tools, but the greatest volume of sales in this market is being closed with the manufacturers. One dealer reports the sale of a large radial drill, several small lathes and several high speed drills to railroads and

manufacturers. Inquiries for a small number of tools are numerous, with calls for large tools predominating. One dealer reports inquiries for a 60-inch boring mill from an Indiana manufacturer and a large open-side planer from an Ohio company. A southern manufacturer is inquiring for a 42-inch lathe. Other inquiries are reported for tools for western railroads and manufacturers. Even with sales continuing to register the same increases as noted during the preceding week, dealers state that there is little possibility of the total business for the month equaling the record for May.

Railroad Buying Feature

CHICAGO, June 26.—Railroads continue the most important factor in the machine tool field, and while some of this business has been placed recently there is still more to be bought. In addition to closing for its list recently, the Chicago & Northwestern railroad has placed a 26-inch shaper and a power hack saw. The Denver & Rio Grande Western railroad is about ready to distribute the equipment for which it made inquiry a few days ago. Nothing has developed in regard to the inquiry of the Burlington railroad, except that it is being handled through the purchasing department of this railroad.

June is giving a fair total of sales, which is made possible by railroad buying already closed. Some attractive business is in prospect from industrial users, several of whom are inquiring for small groups of equipment.

Inquiries Fairly Numerous

PITTSBURGH, June 26.—Fairly numerous inquiries are before the machine tool and equipment trade here, the largest of which is the one for 75 items for the Sharon, Pa. transformer plants of the Westinghouse Electric & Mfg. Co., referred to last week. This interest likewise is asking for 14 machines for its East Pittsburgh, Pa. works. Early action on both of these requirements is expected, tabulation of bids now being completed. The Pittsburgh board of education likewise has a fairly large list out calling for lathes, drill presses, planers, shapers, drilling machines, grinders, blowers, furnaces, etc. for the Westinghouse High school. General buying is somewhat deferred various interests, because of labor shortages, being unable to operate plants to full capacity.

The used machinery market still is comparatively active and most of the propositions are for single machines for shipment to far distant points. For instance one interest which sold in excess of $10,000 worth of machines this past week, reports the disposal of one gear-hobber in that group, representing about $6000, to a user on the Pacific coast. It likewise sold a roll lathe and alligator shear for shipment to Mexico and a bulldozer to an Ohio user. An other house sold a 250-pound steam hammer to an Indiana manufacturer and also reports the inspection of a planer in Florida by a customer in Georgia. The interest in used machinery continues to reflect the high prices prevailing on new equipment. Competition on good used equipment is exceedingly keen, as indicated by the recent sale of a large boring mill conceded to be 98 per cent new. As new, this machine would bring about $4350 and whereas good used machinery usually brings 60 per cent of the price of new, the sales price of this particular item was $1800. Three or four telegraphic inquiries were received late last week and these probably will be closed during this present week. One of these calls for 12 different items. A few individual crane orders and inquiries are noted but the Westinghouse Electric & Mfg. Co. is about to close on five cranes for Sharon, Pa. One orange-peel bucket for the Duquesne Slag Products Co., Pittsburgh, was sold by the Hayward Co., New York.

Orders are Increasing

MILWAUKEE, June 26.—Industrial works, principally those engaged in metalworking, report a recovery from the slackening of orders noticed during most of the month of May, and indications are that after July 1 new business will be more plentiful. Plant activity has not been affected and enough business is on books to sustain the present rate for some time to come. Machine tools shops are getting fair business, although this is now more of a scattered nature than before and usually consists of single tool orders.

Crane Awards and Inquiries of the Week

Orders Placed

One cupola charging crane, 3-motor, 39-foot 6-inch span, for the National Radiator Co., Johnstown, Pa., through the Pittsburgh office of the Milwaukee Electric Crane & Mfg. Co., Milwaukee.

One 18-ton locomotive crane to the Belt Railway of Chicago; one 10-ton crawler crane to J. P. Lyon, Robinson, Ill., by McMyler Interstate Co.

One 2-ton chain hoist for Phoenix Utility Co., 71 Broadway, New York, to the Reading Chain & Block Corp.

One cupola charging crane, 39-foot, 6-inch span, for the National Radiator Co., Johnstown, Pa., to the Milwaukee Electric Crane & Mfg. Co.

Nine electric overhead cranes purchased by the General Electric Co. for its Schenectady, N. Y., plant, as follows: One 15-ton, one 10-ton and two 5-ton electric cranes, all of 46-foot, 9-inch span, from Alfred Box & Co., four 3-ton electric cranes, 25-foot, 7-inch span, from the Cleveland Crane & Engineering Co.; and one 10-ton electric crane from the Whiting Corp.

One 100-ton electric crane, 80-foot span, purchased through Henry L. Doherty & Co., New York, from the Whiting Corp.; the crane is for shipment to Valmot, Colo.

One 25-ton electric overhead crane for the International Paper Co., reported placed.

One 15-ton handpower crane, 25-foot span, placed with the J. G. White Engineering Corp., New York, with an eastern builder.

One 15-ton used Industrial crane for the Pogie Contracting Co., Cincinnati, to Philip T. King, 30 Church street, New York.

One 20-ton handpower crane, 59-foot span, for the Farr Alpaca Co., Holyoke, Mass., to Middlewestern builder.

Two 10-ton electric cranes, with 47-foot span, for the Westinghouse Electric & Mfg. Co., Philadelphia, to the Champion Engineering Co.

One bunkering crane for the American Coal Co., Havana, Cuba, to the McMyer-Interstate Co.

One 40-ton locomotive crane for the Buffalo plant of the Union Carbide Co., to McMyler-Interstate Co.

One 20-ton locomotive crane for the Chesapeake & Ohio, to the Brown Hoisting Machinery Co.

Two 12-ton and two 5-ton hoists, equipped with trolleys, for the Anaconda Copper Mining Co., New York, reported placed with Yale & Towne.

One 5-ton handpower crane and hoist, 35-foot span, for Sar Vant-Discrow Co., 331 Madison avenue, New York, to unnamed builder.

One crawler tread crane for Calumet & Arizona Mining Co., New York, to unnamed builder.

One 5-ton crane from Campbell & Horrigan, Pittsburgh, to Curtis & Co., St. Louis.

One 2-ton hand-operated ice crane from the Singer Ice Co., McKees Rocks, Pa., to Curtis & Co., St. Louis.

One 1½-cubic yard 2-line bucket trolley, with bucket, manufactured by the Blaw-Knox Co., Blawnox, Pa., for the Gary Tube Co., Gary, Ind., or the National Tube Co., Lorain, O., to the Cleveland Crane & Engineering Works, Wickliffe, O.

Two 20-ton locomotive cranes for the Vang Construction Co., to the Browning Co.

One 3-motor 5-ton grab bucket crane with 50-foot span for the Wyoming, Mich., yards of the Pere Marquette railroad, to the Northern Engineering Works. This is in addition to a similar crane recently awarded for installation at the road's Detroit yards.

One special locomotive crane for the South Duquesne works, Carnegie Steel Co., to the Industrial Works.

One 3-motor electric crane of 10 tons capacity with 57-foot span for the Fisher Body Co., Detroit, to the Northern Engineering Works, Detroit.

One 5-ton grab-bucket electric crane with 50-foot span for handling cinders for Battery & Kipp, Chicago, to the Northern Engineering Works.

One 10-ton handpower crane of 31-foot span for the Fisher Body Co., Detroit, to the Northern Engineering Works.

One 5-ton electric traveling crane trolley for the Laclede Steel Co., St. Louis, to the Northern Engineering Works.

Orders Pending

One 30-ton locomotive crane for the Phoenix Utility Co., 71 Broadway, New York; inquiry supplants one issued some time ago for a 15-ton crane; company also inquiring for three hoists, averaging around 1½ tons.

One 30-ton locomotive crane (25-ton originally inquired for but 30-ton now being considered) for the Bellaire, O. plant of the Carnegie Steel Co., for loading and unloading barges on the river; all bids in.

One 30-ton locomotive crane for Mingo Junction, O. plant of the Carnegie Steel Co.; bids being considered.

Five cranes for the Sharon, Pa., transformer plant of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., two each 3-ton and 5-ton and one 10-ton bids being tabulated.

Dealers report a fair demand and find used tools moving fairly well but buyers are discriminating keenly in favor of the most modern designs and are averse to taking equipment that requires considerable expense in repairs or additions to make them reasonably equivalent to modern machines. Garage construction is still active all through Wisconsin and a good many machines are being worked into this channel.

Confidence In Prices Lacking

BOSTON, June 26.—New England manufacturers although in many cases in need of tools still hold off buying apparently lacking confidence in the stability of present prices. Prices of new tools have scarcely stopped advancing yet many authorities are now looking for early concessions. The used tool market in New England is softer than it was early in the month. This, however, is undoubtedly due in part to the large number of auction sales held during the last two weeks. Inquiry for machine tools is reported slightly better by one or two of the principal dealers. Sales, however, during the past week continued dull in Boston, Springfield, Mass., and Providence, R. I., and New England machine tool manufacturers report a rather abrupt falling off in future orders for machine tools. Production at most of these plants remains unchanged. One or two, however, have reported decreased operations during the past week. Several railroads are more or less actively in the market for tools and other equipment. The Rutland railroad is inquiring for a lathe and several other tools. The General Electric Co., during the week bought four 16-inch lathes for a New England plant and Stone & Webster Corp., bought a 3-foot radio drill, a 16-inch shaper and a 26-inch lathe for a plant in Indiana. Complete equipment in the plant of the George H. Adams Co., at Hill, N. H. manufacturer of knitting needles, is to be offered at auction June 26. The Boston school board is asking for bids on the woodworking machinery and light lathes. The Springfield, Mass., school board is also in the market for light tools for a technical high school.

Demand Is Active

TORONTO, June 25.—An active demand for machinery and machine tools continues a feature of the Canadian market. While no large lists made their appearance during the week, a fairly large volume of orders were received from individual buyers in small lots. Inquiry continues active and dealers and builders have a large quantity of prospective business in sight the greater part of which is expected to turn into sales in the early future. No lists of size have been issued by the various Canadian railroads, but orders for two or three tools at a time have been fairly steady and it is understood that the Canadian Pacific railway will shortly be entering the market for equipment for new shops to be constructed in western Canada. The automotive industry is a good customer to the trade and some big orders have been closed with automobile makers during the past few weeks, while at the same time there are a number of plants under construction for which equipment has not yet been purchased. Several local dealers have made predictions that June will show a record in so far as machine tool sales are concerned and that the outlook for the future is exceedingly bright. Announcements have been made within the past few weeks regarding construction work in various towns and cities on electric and waterworks plants for which some extensive equipment buying will be necessary. The demand for machine shop equipment is also good at the present time. Small tools are in demand and dealers report a steady flow of orders for these commodities with improvement in quantities required.

Construction and Enterprise

Concise and Timely Business Building Opportunities from the Field of Industry

East of the Mississippi River

PLANTSVILLE, CONN.—The Walker-Stuart Foundry Co. is planning the erection of an addition to its plant.

WEST HAVEN, CONN.—The American Steel & Wire Co. has let the contract for a brick and steel, 1-story, 41 x 28-foot power house addition to cost $16,000.

JACKSONVILLE, FLA.—The Florida Machine Works, 40 Riverside avenue, plans to erect a foundry at an estimated cost of $50,000.

CHICAGO—Plans are being prepared by the Pettibone-Mulliken Co., 140 South Dearborn street, manufacturer of frogs and switches, for alterations to its foundry to cost approximately $20,000.

CHICAGO.—The Goss Printing Press Co. has bought a site at Fifteen place and Wood street, Chicago, adjoining its present plant, on which it will eventually build an addition.

CHICAGO.—Bids are being received by L. G. Hallberg & Co., 116 South Michiboulevard, Chicago, for a power house, 45 x 48 feet, at East 103rd street and Torrence avenue, Chicago, for the Chicago Steel & Wire Co., to cost $100,000.

CHICAGO.—Mojonnier Bros. Co., manufacturers of dairy machinery, has bought a site at Ohio street and Kilpatrick avenue, Chicago, on which it will build a 1-story factory building, 124 x 200 feet. This plant will be used as a consolidation of the Chicago and Milwaukee plants of this company.

BRAZIL, IND.—A. J. Eaglesfield, Indianapolis, has purchased the Union Steel Co. factory building and machinery, which has been in the hands of a receiver, and is preparing to operate it in the manufacture of lathes and woodworking machinery.

WASHINGTON, IND.—The Leonard Range Co. will take bids for a new 2-story and basement plant including foundry and assembling equipment estimated to cost $100,000.

PORTLAND, ME.—The Portland Electroplating Co. has been incorporated for $10,000. Edwin A. O'Connell of Portland is one of the directors.

CHESHIRE, MASS.—Shattuck-Jones Co., Inc., has been incorporated for $50,000 by F. A. Shattuck, E. A. O'Rourke and Alice Sullivan to manufacture machinery and electrical equipment.

NORTH ATTLEBORO, MASS.—The M. J. Brohan Co. has been incorporated to make tools with a capital stock of $50,000 by Joseph N. Brohan, S. Brohan and Charles J. Rahcourt.

SALEM, MASS.—The Parent Machine & Screw Co., Inc., has been incorporated with $100,000 capital by Arthur Goddu, Wilfred A. Parent and Charles Turcotte.

WORCESTER, MASS.—The American Steel & Wire Co., is to erect a brick and

steel, 1-story, 55 x 95-foot annealing building at its Central works.

BALTIMORE—The Offutt Tobacco Machinery Corp., 852 Equitable building, has been incorporated with $150,000 capital stock by Albert L. Watkins, Philip G. Spencer and Fred H. Johnson, to manufacture tobacco machinery.

DETROIT.—A new factory for the Denby Motor Truck Co. will be built by Frank L. Bromley, president, Detroit Foundry Co.

BROOKLYN, N. Y.—The plant of the Columbia Machine Works & Malleable Iron Co. was badly damaged by fire June 21.

BROOKLYN, N. Y.—The Riverdale Iron Works has been incorporated with $5000 capital stock by E. Venit, W. Taubin and S. Rosenberg. The company is represented by E. Larkin, 381 Livonia avenue.

GREEN ISLAND, N. Y.—A factory costing $150,000 is contemplated by the Manning Abrasive Co., Twenty-sixth street.

NEW YORK—The Combined Drill & Screw Set Co. has been incorporated with $25,000 capital stock by S. Solop, H. Greenberg and others. The company is represented by S. Kohler, 152 West Forty-second street.

WALNUT COVE, N. C.—Plans have been authorized for a $90,000 municipal hydro-electric power plant. The J. B. McCrary Co., Atlanta, Ga., is engineer.

CANTON, O.—The Canton Metal Products Co., has been incorporated with a capital of $200,000 to engage in the manufacture of general metal products, mostly for the automotive industry.

CLEVELAND.—The Cleveland Knife & Forge Co. has increased its capital stock from $100,000 to $200,000.

CLEVELAND—The Brown Fence & Wire Co. has been incorporated with $1000 capital stock by J. G. Tischler, W. C. Taylor, E. C. Fast, T. P. Christian and J. M. Spangler.

CLEVELAND.—The Protective Coatings Co. has been incorporated with $10,000 capital stock by P. J. Daley, Guardian building, M. J. Gridna, Frank T. Cullitan, A. M. Franklin and F. R. Franklin.

CLEVELAND—An 81 x 203 factory building will be erected at Marion avenue and E. Twenty-second street by Mrs. Lena Russell, Hotel Regent. The property will be leased for 10 years by the Klein & Patterson Body Co.

COVENTRY, O.—Preliminary plans are being drawn for the construction of a factory by the Whitman & Barnes Mfg. Co., Akron. The factory will cost $300,000.

KENTON, O.—The Daniel Husker & Implement Co. has been incorporated for $50,000 by E. H. Daniel, W. W. Bowers, C. C. Patton, Frank Laubis and H. E. Pearce. The plant will motorize corn huskers.

LOUISVILLE, O.—The Hydro Forge Co. has been incorporated with $500 capital stock by D. Kendall, J. H. Thrailkill, H. K. Strickler, J. C. Strickler and Helen M. Miller.

MASSILLON, O.—The Ohio Cutlery Co., recently destroyed by fire, will be in operation as soon as machinery can be installed in a building which has been leased.

MASSILLON, O.—The Massillon Steel Joist Co. has been incorporated by C. W. Anderson and E. E. Moser. The company is arranging for lease on a building here and will begin operations in the near future.

BETHLEHEM, PA.—Work will be started shortly on a new steel and concrete plant addition for the Superior Metal Works.

LEHIGHTON, PA.—The Lehighton Water Co. contemplates improvements and extensions to its plant, costing $40,000.

BETHLEHEM, PA.—A $200,000 electric plant will be erected between Shimersville and Freemansburg, by the Pennsylvania Power Light Co. The present station in this city will be demolished.

CONSHOHOCKEN, PA.—Additional property has been purchased by the Hale Fire Pump Co. for an extension to its plant.

ERIE, PA.—The Carbo-Oxygen Co. plans the building of a factory addition costing $10,000.

GLENSIDE, PA.—Frank C. Hood is low bidder on the erection of a manual training school and power house. Heacock & Hokanson are architects in charge.

PHILADELPHIA—The William Steel & Sons Co. is preparing plans for a factory building for the North Bros. Mfg. Co.

PHILADELPHIA—A power plant will be built for the Frank Schoble & Co., Tenth and Oxford streets, at a cost of $190,000.

PHILADELPHIA—The Ballinger Co. has been awarded the general contract for the erection of a $155,000 factory.

PHILADELPHIA—Contract for the erection of a $35,000 machine shop for the Philadelphia Gear Works, Inc., has been awarded to the A. Raymond Raff Co.

PHILADELPHIA—Plans are being prepared by Edward Schoepple, architect, for a machine shop and garage in Harvey court, rear Twenty-first street.

PHILADELPHIA—William Steele & Sons Co., engineers, are preparing plans for the erection of a power house for Frank Schoble & Co., hat manufacturers.

PHILADELPHIA—The Austin Co. has been awarded the contract for the erection of a $20,000 foundry addition for the Dodge Steel Co.

PHILADELPHIA—The Truscon Steel Co. has been awarded the general contract for the erection of a $40,000 machine shop for Henry F. Sashesnomajer, Ashburner and Tulip streets.

PHILADELPHIA—Contract for the erection of a $60,000 machine shop for the Kitsno Co. has been awarded to Wm. Steel & Sons Co. The proposed structure will be erected at Stokeley and Westmoreland streets.

PHILADELPHIA—The General Electric Co. has awarded a contract to Harris & Richards for the erection of a $500,000 manufacturing plant at Sixty-eighth street and Elmwood. The plant will be used for the manufacture of switchboards and will consolidate the switchboard manufacturing operations of the Baltimore, Philadelphia and Schenectady plants. The present plant in Philadelphia, it is understood, will be used as a warehouse. While the tentative figures are being asked on some lines of equipment, including cranes, it is likely that no formal list will be brought out for some time. When this project came up for consideration some two years or so ago, it was thought that about six 3-ton cranes would be required.

WEST CONSHOHOCKEN, PA.—Work will be started shortly on the erection of a large

Business Changes Recently Announced

THE Whiting Corp., Ill., has opened a district sales office at 1526 Jefferson County Bank building, Birmingham, Ala., in charge of W. R. Hanna. The Birmingham office will handle sales in Alabama, Georgia, Tennessee and Northern Mississippi. This company will open offices on July 1 in the Penton building, Cleveland, in charge of R. P. Dryer. This office will have charge of sales in Ohio.

* * *

The Tropenas Co., engineer, has removed its office at 2236 Cunard buildings, 25 Broadway, New York, discontinuing its Brooklyn office.

* * *

Elgin Motors, Inc., has taken over the business of the Elgin Motor Car Corp. Argo, Ill., and will establish a plant at 323 West Fifteenth street, Indianapolis.

* * *

The Hurlbut, Rogers Machinery Co. have opened a plant at Nashua, N. H. The plant of this company formerly located at South Sudbury, Mass. recently was destroyed by fire.

* * *

A. G. Schoonmaker & Sons, Inc., dealers in used and rebuilt machinery have moved from 25 Church street to quarters on the seventeenth floor of 30 Church street, New York.

* * *

J. E. Haetten & Co., Inc., 30 Church street, New York, has acquired the Backer Machine Tool Supply Co., and will operate it under the name of J. E. Haetten & Co., Inc.

* * *

The following have been appointed sales representatives for the Oilgear Co., Milwaukee, Wis.; Federal Machinery Sales Co., 12 North Jefferson street, Chicago; Laughlin-Barney Machinery Co., Union Trust building, Pittsburgh; and Elliott & Stephens Machinery Co., 721 Olive avenue, St. Louis.

Warehouse Steel Prices

Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Boston	3.515c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Cleveland	3.36c
Detroit	3.35c
Los Angeles	4.30c
New York	3.54c
Philadelphia	3.55c
San Francisco	4.00c
Seattle	4.10c
St. Louis	3.35c
St. Paul	3.45c

IRON BARS

Boston	3.515c
Buffalo	3.50c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Detroit	3.35c
New York	3.54c
Philadelphia	3.55c
St. Louis	3.35c

SHAPES, STRUCTURAL

Boston	3.615c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Los Angeles	4.40c
New York	3.64c
Philadelphia	3.65c
San Francisco	4.10c
Seattle (large shapes)	4.20c
St. Louis	3.45c
St. Paul	3.55c

PLATES

Boston	3.615c
Boston 3/16-inch	3.04c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Detroit, 3/16-inch	3.45c
Los Angeles	4.45c
New York	3.64c
Philadelphia	3.65c
Philadelphia, 3/16-inch	3.95c
San Francisco	4.10c
Seattle	4.25c
St. Louis	3.45c
St. Paul	3.55c

NO. 10 BLUE ANNEALED SHEETS

Boston, 3/16-inch	4.615c
Buffalo	4.45c
Chicago	4.35c
Cincinnati	4.10c
Cleveland	3.75c to 4.06c
Detroit	4.30c
Los Angeles	5.20c
New York	4.59c
Philadelphia	4.25c
San Francisco	5.25c
Seattle	4.75c
St. Louis	4.45c
St. Paul	4.60c

NO. 28 BLACK SHEETS

Boston	5.75c
Buffalo	5.25c
Chicago	5.20c
Cincinnati	4.90c
Cleveland	4.75c
Detroit	5.15c
Los Angeles	6.50c
New York	5.15c
Philadelphia	5.15c
San Francisco	6.30c
Seattle	5.75c
St. Louis	5.30c
St. Paul	5.45c

NO. 28 GALVANIZED SHEETS

Boston	6.90c
Buffalo	6.35c
Chicago	6.35c
Cincinnati	5.90c
Cleveland	5.80c
Detroit	6.30c
Los Angeles	7.30c
New York	6.05c to 6.15c
Philadelphia	6.25c
San Francisco	7.15c
Seattle	6.75c
St. Louis	6.45c

BANDS

Boston	4.80c
Buffalo	4.35c
Chicago	3.95c
Cincinnati	4.00c to 4.10c
Cleveland	4.01c to 4.16c
Detroit	4.10c
Los Angeles	5.20c
New York	4.39c
Philadelphia	4.35c
San Francisco	4.75c
Seattle	5.10c
St. Paul	4.20c

HOOPS

Boston	5.80c
Buffalo	4.65c
Chicago	4.55c
Cleveland	4.01c to 4.16c
Detroit	4.95c
New York	5.19c
Philadelphia, 1 inch and wider 20 gage and heavier	4.75c
Seattle	5.50c
St. Paul	4.80c

COLD ROLLED STEEL

Boston (rounds)	4.75c
Boston (shapes)	5.25c
Buffalo (rounds)	4.70c
Buffalo (shapes)	5.20c
Chicago (rounds)	4.55c
Chicago (shapes)	5.05c
Cincinnati (rounds)	4.50c
Cincinnati (shapes)	5.00c
Cleveland (rounds)	4.25c
Cleveland (shapes)	4.75c
Detroit (rounds)	4.55c
Detroit (shapes)	5.05c
Los Angeles (rounds	5.25c
New York (rounds)	4.65c
New York (shapes)	5.15c
Philadelphia (rounds)	4.35c
Philadelphia (shapes)	4.85c
San Francisco (rounds)	5.50c
Seattle (rounds)	6.00c
St. Paul (rounds)	4.55c

warehouse for the Merion Worsted Mills. Edwin A. Yeo, is architect.

WOODLAWN, PA.—Manual training equipment will be installed in the 3-story high school to be erected at a cost of $500,000.

PROVIDENCE, R. I.—The Weeks Merit System, Inc., has been incorporated to build machinery with 500 shares of stock without par value by Shirley S. Weeks, E. S. Weeks and E. Butler Moulton.

CHATTANOOGA, TENN.—Approximately $1,000,000 will be spent by the Crane Enamelware Co., a subsidiary of the Crane Co., Bridgeport, Conn., manufacturer of plumbing supplies, on an extension to its plant. The Crane Enamelware Co. manufactures bathtubs and other sanitary ware.

NASHVILLE, TENN.—The Southern Engine & Boiler Works has purchased property for the building of an addition. The company will manufacture steel freight and coal cars.

BLUEFIELD, W. VA.—The Appalachian Power Co. has increased its capital from $3,500,000 to $7,500,000. Plans for the building of additional electric generating stations are being considered.

CHARLESTON, W. VA.—The Metal Products Co. has been incorporated by J. T. Flynn, Charles E. Kitchen and Joe L. Silverstein with a capital stock of $25,000.

WHEELING, W. VA.—Fire destroyed the machine shop of the George M. Jones Coal Co. recently.

WHEELING, W. VA.—The Kaolite Mfg. Co. has purchased property for the erection of a plant to manufacture brick for furnace lining.

WHEELING, W. VA.—The McGraw Motor Co. will install a machine shop and parts department in the new building.

APPLETON, WIS.—A site of 121 x 137 feet at Morrison and Washington streets has been purchased by the Valley Automobile Co., 726 College avenue, which will lay foundations next fall for a 4-story fireproof garage and repair shop covering nearly the entire area.

CASHTON, WIS.—The Mankato, Minn., Construction Co. is the successful bidder at $38,494 for building a complete sewerage system and sewage disposal plant, equipment for which will be purchased by the concern.

DARLINGTON, WIS.—A. C. Poole will build a new public garage and repair shop, 40 x 100 feet, partly two stores high, at Main and Louisa streets. It will cost $15,000.

GREEN BAY, WIS.—The Bay Verte Machinery Supply Co. has increased its capital to $25,000 and changed its name to Bay Verte Machinery & Supply Co.

GREEN BAY, WIS.—The Green Bay Foundry & Machine Co. contemplates the erection of an addition to the gray iron foundry and the conversion of a part of the present casting shop into a machine room addition. The casting shop addition costing $25,000.

HILBERT, WIS.—The Appleton (Wis.) Construction Co. has the general contract to build a $25,000 public garage and repairshop, 50 x 120 feet, 2-story, for Dr. C. F. Lawler here.

LA CROSSE, WIS.—The Grahn & Bathurst Co., Minneapolis, has been awarded the general contract to build the new Roosevelt vocational training institute, to cost about $200,000 complete.

LADYSMITH, WIS.—Bids will be asked at once for the construction of a manual arts addition, 60 x 75 feet, 2-story, to the Ladysmith high school. Architect E. J. Hancock, Eau Claire, Wis., is completing plans. L. C. Streator is secretary of the board of education.

MADISON, WIS.—Frederickson Bros., have taken the contract to build a $100,000 garage and repair shop for Gill Bros., at 214 West Washington street. The building will be T-shaped, 64 x 264 and 44 x 132 feet.

MADISON, WIS.—The Madison Tool & Stamping Works, 1970 Helena street, has completed an addition consisting of a completely equipped machine shop for servicing and rebuilding any make of passenger and commercial car, tractor and power farm machine.

MADISON, WIS.—A central heating plant to serve downtown buildings will be built by the Washington Building Corp., E. D. Dillon, general manager, at a cost of $75,000. Architect Balch & Lippert expect to have the plans ready for bidders about July 15.

MADISON, WIS.—Plans for an $85,000 addition to the central heating plant of the University of Wisconsin, requiring two large boilers and auxiliaries, are being completed by John C. White, consulting engineer. Bids will be taken after July 15 by M. E. McCaffrey, secretary, board of regents.

MERRILL, WIS.—A new excelsior manufacturing plant, 36 x 108 feet, with a bat-

Bourne-Fuller Service

includes immediate shipment of all Iron and Steel materials from Cleveland and Cincinnati

Warehouses

If you are not receiving our Stock-list we shall be glad to send it to you regularly upon request.

Upson Works

Open Hearth Steel Bars for special uses. Also a complete line of Bolts and Nuts. Prompt Shipments.

THE
BOURNE-FULLER CO.
Iron, Steel
Pig Iron
Coke

CLEVELAND

New York **Chicago** **Detroit**
San Francisco
Cincinnati

tery of 16 cutting machines, will be built here by B. G. Cotter. It will be steam operated.

MILWAUKEE.—The Milwaukee Iron & Metal Co. has been organized by Jacob Ullman, 397 Webster place, and others, to deal in metals, metal products, scrap, etc.

MILWAUKEE—The American Electric Motors Inc., 57 Erie street, has increased its capital stock from $100,000 to $150,000. The company manufactures electric motors. Joseph J. Brauer is secretary and treasurer.

MILWAUKEE.—The Modern Auto Repair Co., 2425-2429 State street, will build a 1-story fireproof addition, 110 x 125 feet, of which more than half the space will be used as a machine and service shop addition.

MILWAUKEE.—Articles of incorporation have been filed by the Wisconsin Duplex Percolator Co., capitalized at $25,000 to manufacture domestic appliances of metal. The incorporators are F. J. Beyersdorf, R. C. Russell and C. J. Parkowski.

MILWAUKEE.—Charles H. Eis, North Milwaukee, and W. A. Gettelman and A. J. Rottman, Milwaukee, have organized the Automatic Burner Co. with $10,000 capital to manufacture oil burners for heating plants.

MILWAUKEE.—A loss of $50,000 was caused by fire in the factory of the Eslien Sheet Metal Works, 1001 Thirtieth street. A large addition recently finished escaped, only the original structure being burned. This will be reconstructed at once, and new machinery installed.

MILWAUKEE.—A charter has been granted to the American Oil Burner & Heating Co. of Milwaukee to manufacture and market electric, gas and oil burners. The capital stock is $10,000. Roscoe R. Rockhill, H. J. McGrath and I. R. Rockhill are the incorporators.

MILWAUKEE.—Julius, Samuel and Morris Meyer, conducting the Wisconsin Belting & Supply Co. at 481 Third street, have incorporated under the same name, and with $25,000 capital stock. They are manufacturers and dealers in all kinds of factory, shop and mill equipment and supplies.

MILWAUKEE.—The Manufacturers' Equipment Co. capital stock $25,000, has been formed to manufacture and deal in used and new factory and shop equipment, machinery, etc. The incorporators are Victor Meyer, George Vogt and A. J. O'Connor, attorney, 85 Michigan street.

MILWAUKEE.—Articles of incorporation have been filed by the Dostal & Lowey Hydro Co., Milwaukee, organized with $15,000 capital to manufacture bottle washing machines, sterilizing apparatus and other special machinery. The incorporators are John R. Dostal, John R. Lowey and Arthur J. Ehne.

MUSCODA, WIS.—A furniture factory, 60x85 feet, will be built by the Muscoda Mfg. Co. costing $15,000.

MUSCODA, WIS.—The Muscoda Furniture Co. is taking bids for a 2-story mill manufacturing addition, 60 x 85 feet..

NEENAH, WIS.—Harry and Will Niles have purchased the Neenah Boat Works from C. A. Sorenson, who retires. The new owners plan numerous improvements. The concern builds metal and wood hulls, yachts, launches, power boats and canoes.

OSHKOSH, WIS.—The Universal Motor Co. has increased its capital stock from $100,000 to $200,000. The company is planning to increase its output of gasoline engines, farm lighting systems, etc. John D. Termaat is president.

OSHKOSH, WIS.—The capital stock of the Wellman Turbine Co. has been increased from $25,000 to $50,000 for general expan-

(*Continued on Page* 1916)

New Trade Publications

TRUCKS—A 32-page booklet recently published by the International Motor Co., New York, illustrates and describes the uses to which the automobile truck has been placed in the oil industry. A 45-page booklet published by the same company contains illustrations and descriptions of the various parts and designs of trucks developed by this company.

CRUSHERS—Hammer crushers for breaking up cement rock and limestone are described and illustrated in a 16-page booklet issued by the Pennsylvania Crusher Co., Philadelphia. Equipment for the preparation of coal also is featured. A part of the equipment of this crusher, which is furnished if desired, is the tramp iron separator.

CONVEYORS—The Conveyors Corp. of America, 326 West Madison street, Chicago, have just issued an 8-page booklet entitled "Representative Installations." The booklet contains illustrations of a number of notable buildings and power plants which are equipped with a steam jet ash conveyor, a method of ash removal which uses a jet of high velocity steam as the motive power.

FORCED DRAFT SYSTEMS—Two types of fans for producing mechanical draft are described in a 4-page pamphlet published by the B. F. Sturtevant Co., Hyde Park, Boston. A performance curve of the fans is included, showing the total pressure, static pressure, horsepower, mechanical efficiency and static efficiency. Illustrations of the fan wheels are also included.

WATER SOFTENERS—Equipment adapted for heating boiler feed water is described in an illustrated 12-page booklet published by the Graver Corp., Chicago. Two types of water softeners are manufactured by this company. Results of analysis of Lake Michigan water are included, showing the best type of boiler for use in softening water for boiler feed purposes.

DRILLS—A 112-page booklet has been issued by the Latrobe Tool Co., Latrobe, Pa., describing and illustrating the various types of high speed tools manufactured by this company. Information is given relative to the dimensions and price of the high speed drills and reamers and also information on the methods of grinding the tools. Factors governing feeds and speeds are also listed.

TROLLEYS—The Yale & Towne Mfg. Co., Stamford, Conn., recently has issued an illustrated folder describing a roller bearing steel plate trolley. The folder contains, in addition to detailed descriptions of the plain and geared types of steel plate trolleys, a description of the new cast iron trolley. Incorporated in the booklet are details of tests to which the new steel plate trolley was subjected, and a complete list of the material handling equipment manufactured by this company.

BOILERS—The Heine Boiler Co., St. Louis, has published an illustrated 4-page pamphlet describing boilers. Illustrations of the front of the boiler with stoker equipment, and the rear with the blow off for muddrum are shown. The pamphlet also describes a novel installation where the boilers manufactured by this company operate in conjunction with fans and equipment for washing the gases formed by combustion, thus constituting a power plant without a smoke stack.

LIFT TRUCK SYSTEMS—The Steubing Truck Co., Cincinnati, recently has published two folders describing the lift truck and platform systems manufactured by this company. The trucks are adapted for use in foundries and steel warehouses, providing an efficient method of handling material. The movable and interchangeable platform is of wood and steel construction, and may be used with either hand or power lift trucks. The lift trucks described are of the hand operated type.

ELECTRIC DRILL REPAIR PARTS—Featuring its interchangeable part list for electric drills, the Independent Pneumatic Tool Co., Chicago, has issued a 60-page catalog listing the myriad parts of its electric drills, accompanied by halftone plates showing the actual parts. The list is in tables showing how the interchangeable parts apply to the several types of machine and making clear just what to order. There also is a chapter devoted to wiring diagrams of the several types of drills and instructions as to the care of the drills.

THREAD GRINDING—Grinders designed to produce a finished hardened thread having all surfaces in concentric alignment are featured in a 28-page booklet published by the Precision & Thread Grinder Mfg. Co., Philadelphia. While designed for internal and external thread grinding, it has been found that the machines are adapted to unusual grinding operations which are frequently encountered. It is claimed that the grinder can be used as attachments on any size or style of machine tool, doing the grinding operations before the job is removed from its setting in the machine. The booklet is well illustrated.

ELECTRICAL SUPPLIES—The Westinghouse Electric & Mfg. Co., East Pittsburgh, now is distributing its supply catalog. This issue replaces and supersedes all catalogs issued heretofore on electrical supplies by the company. The former editions have proved so satisfactory that no essential features have been altered, the improvements being largely a matter of detail and refinement. The catalog is indexed according to subjects and to sections and also has a style number and a thumb index. In addition, a new feature, a classified index, has been added to the introductory section. Here is listed apparatus of particular interest to central stations, electric railways, industrial plants, mines, architects, etc. In all 300 pages are devoted to descriptive matter, technical data, dimension drawings, specifications and prices. The material includes all new apparatus developed in the last two years. The street lighting section probably shows the greatest revisions and over 175 pages are devoted to this feature.

Calorized Recuperation is Simple Arithmetic.

Problem

What reduction in fuel consumption is effected by pre-heating to 1170° F. the air required to burn one gallon of Fuel Oil?

Solution

112 lbs. = Air required to burn one gallon of fuel oil.
1170° F = Temperature to which air is raised by recuperator.
.259 = The mean Specific Heat of air at 1170° F
Quantity of heat in air (B.T.U.) = Weight of Air x Tem. Rise x Mean Specific Heat = 112 x 1170 x .259
= 33,939 B.T.U.

112
1170
7840
1120
1120
131040
.259
1179360
655200
262080
33,939.360

Total B.T.U. in one gal. Oil = 128,000
B.T.U. saved through Recuperation = 33,939

SAVING EFFECTED BY RECUPERATION 26.5%

There is nothing uncertain about the 20 to 40 per cent fuel saving to be effected by the application of a Calorized Recuperator to the average industrial furnace. You can readily determine it for yourself.

The flue gases contain a definite quantity of heat, based on the fuel burned per hour and the temperature of the gases.

This heat is utilized to raise to a predetermined temperature the known weight of air required for perfect combustion. In this way the fuel consumption of the average industrial furnace can be reduced 25 per cent.

The coupon brings literature which will enable you to determine accurately the fuel saving possible by the application of a Calorized Recuperator to your furnace.

CALORIZING

What it is:—

Calorizing is a process, patented by the General Electric Co., in which aluminum is driven into steel tubes so as to form aluminum alloy surfaces. Tubes so treated will successfully withstand high temperatures.

A Calorized Recuperator can be readily applied to the great majority of furnaces, large or small, old or new.

Clip this coupon

The Calorizing Company
Oliver Building, Pittsburgh

Information which will enable me to determine the fuel I can save with a Calorized Recuperator interests me.

Name:_____ Position:_____

Company Name:_____

Address:_____

East of the Mississippi

(*Concludd from Page* 1916)

sion purposes. Calvin W. Wellman is president and general manager.

PORT WASHINGTON, WIS.—Gibson Brothers Mfg. Co. of Fredonia will locate a branch of its concrete mixer Foundry here. Operations will start immediately.

PORTAGE, WIS.—Pearsel, Greeley & Hansen, engineers, 39 West Adams street, Chicago, are preparing plans for a complete filtration plant to be built in connection with the city water system at a cost of $100,000. It will have a capacity of 1,500,000 gallons a day. Bids probably will be taken shortly after July 1.

SHARON, WIS.—W. G. Kirchoffer, consulting engineer in charge of a waterworks improvement here has placed contracts for two new airlift pumps with the Wisconsin Foundry & Machine Co., Madison, Wis.

VIROQUA, WIS.—Vocational training departments will be installed in the high school to be built at an estimated cost of $190,000.

VIROQUA, WIS.—Bids are being taken until June 18 for the construction of the new

Iron and Steel Prices

Iron Ore

LAKE SUPERIOR ORES

Per Gross Ton Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Mesabi Bessemer, 55 per cent iron	6.20
Old Range nonbessemer, 51½ per cent iron	5.70
Mesabi nonbessemer, 51½ per cent iron	5.55

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 53 to 63 per cent	10.00 to 11.00
Copper free low phosphorus 53 to 65 per cent	13.25 to 16.50

FOREIGN IRON ORE

Cents per unit, c.i.f. Atlantic ports

Spanish low phosphorus, 52 to 54 per cent	nominal
Algerian low phosphorus, 52 to 54 per cent	nominal
Swedish and Norwegian low phosphorus, 68 per cent	nominal
Swedish foundry or basic, 66 to 68 per cent	11.25
Spanish foundry or basic, 50 to 54 per cent	nominal

Manganese Ore

Prices do not include duty at rate 1 per cent per pound of metallic manganese contained.

Brazilian, minimum 47 per cent	nominal
Indian, minimum 47 per cent	42 cents c.i.f. tidewater
Caucasian, 53 to 55 per cent	
Caucasian, 53 to 55 per cent.	nominal

Fluor Spar

85 and 5% grade

Washed gravel, Kentucky and Illinois mines, per net ton	$20.00 to $23.50

Rivets

Structural rivets, Pittsburgh	3.25c
Boiler rivets, Pittsburgh	3.35c
Rivets, 7/16-in. and smaller	60 and 10 to 60 and 5 off

Nuts and Bolts

NUTS

(Up to 1¼ and 1⅛ inches inclusive)

Hot pressed square or hexagon blank	$3.25 to $3.50 off list
Hot pressed square or hexagon tapped	$3.00 to $3.25 off list
Cold punched square or hexagon blank	$3.25 to $3.50 off list
Cold punched, square or hexagon,	$3.00 to $3.25 off list
Cold punched semifinished hexagon nuts ⅜-inch and larger	70-10-2½ off
Cold punched semifinished hexagon nuts 9/16-inch and smaller	70-10-5 off

Price f.o.b. Pittsburgh, Packages of 50.

CARRIAGE BOLTS

(¾ x 6 inches, smaller and shorter)

Rolled thread	50 and 10 off
Cut thread	50 off
Larger and longer	50 off

MACHINE BOLTS

(¾ x 4 inches, hot pressed nuts)

Rolled thread	60 off
Cut thread	50 and 10 off
Larger and longer	50 and 10 off

(¾ x 4 inches, cold punched nuts)

Cut thread	45 off
Larger and longer	45 off
Lag screws	60 off
Plow bolts Nos. 1, 2 and 3 heads	50-5 off
4 to 10 heads	50-5+20 off
Stove bolts	75-5 off
Tap bolts	25 off
Bolt ends with hot pressed nuts	50-10 off
Bolt ends with cold punched nuts	45 off
Blank bolts	50 and 10 off
Rough stud bolts with nuts	50 off

WASHERS

Wrought washers	$4.85 to $5.00 off

Steel Pipe

(First column*—effective March 19, 1923)
(Second column—effective April 19, 1923)
*Wheeling Steel Corp. discounts.
Pittsburgh basing discounts, jobbers' carloads.

	Butt Weld Black	Galvanized
⅛-inch	44 to 45	18½ to 19½
¼ and ⅜-inch	50 to 51	24½ to 25½
½-inch	55 to 56	41½ to 42½
¾-inch	59 to 60	47½ to 48½
1 to 3-inch	61 to 62	49½ to 50½
Lap Weld		
2-inch	54 to 55	42½ to 43½
2½ to 6-inch	58 to 59	46½ to 47½
7 to 8-inch	55 to 56	42½ to 43½
9 and 10-inch	54 to 54	41½ to 41½
11 and 12-inch	54 to 53	41½ to 40½
REAMED AND DRIFTED		
Butt Weld		
1 to 3-inch	59 to 60	47½ to 48½
Lap Weld		
2-inch	52 to 53	40½ to 41½
2½ to 6-inch	56 to 57	44½ to 45½
EXTRA STRONG—PLAIN ENDS		
Butt Weld		
⅛-inch	40 to 41	23½ to 24½
¼ and ⅜-inch	46 to 47	29½ to 30½
½-inch	52 to 53	41½ to 42½
¾-inch	57 to 58	46½ to 47½
1 to 1½-inch	59 to 60	48½ to 49½
2 to 3-inch	60 to 61	49½ to 50½
Lap Weld		
2-inch	52 to 53	41½ to 42½
2½ to 4-inch	56 to 57	45½ to 46½
4½ to 6-inch	55 to 56	44½ to 45½
7 to 8-inch	51 to 52	38½ to 39½
9 and 10-inch	45 to 45	32½ to 32½
11 and 12-inch	45 to 44	32½ to 31½
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	41 to 42	31½ to 32½
¾ to 1½-inch	44 to 45	34½ to 35½
2 to 2½-inch	46 to 47	36½ to 37½
Lap Weld		
2-inch	40 to 41	31½ to 32½
2½ to 4-inch	42 to 43	33½ to 34½
4½ to 6-inch	41 to 42	32½ to 33½
7 to 8-inch	37 to 38	24½ to 25½

Wrought Iron Pipe

(Effective Jan. 23, 1923)

Pittsburgh basing discounts, jobbers, carloads

THREADS AND COUPLINGS

	Butt Weld Black	Galvanized
¼ and ⅜-inch	+11	+39
½-inch	22	2
¾-inch	28	11
1 to 1½-inch	30	13
Lap Weld		
1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 6-inch	26	11
7 to 8-inch	28	13
9 to 12-inch	26	11

PLUGGED AND REAMED

Two points less than above

EXTRA STRONG, PLAIN ENDS

	Butt Weld	
⅛ and ⅜-inch	+19	+54
½-inch	21	7
¾-inch	28	12
1 to 1½-inch	30	14
Lap Weld		
2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2

DOUBLE EXTRA STRONG

	Butt Weld	
½-inch	+47½	+59¾
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39
Lap Weld		
2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	..

Boiler Tubes

L. C. L. discounts. C. L. 4 points larger

STEEL (Lap welded)

(Effective April 19, 1923)

2 and 2¼-inch	23 off
2½ and 2¾-inch	33 off
3-inch	36 off
3¼ to 3¾-inch	38½ off
4 to 13-inch	42 off

CHARCOAL IRON

(Effective April 12, 1923)

1½-inch	+22
1¾-inch	+12
2 and 2¼-inch	+ 2
2½ to 3-inch	3
3¼ to 4½-inch	5

SEAMLESS COLD DRAWN

(Effective April 19, 1923)

1-inch	51 off
1¼ and 1½-inch	43 off
1¾-inch	27 off
2 and 2¼-inch	18 off
2½ and 2¾-inch	28 off
3 and 3¼-inch	32 off
3½ and 3¾-inch	33 off
4-inch	37 off
4½ and 5-inch	29 off

SEAMLESS HOT ROLLED

3 and 3¼-inch	34 off
3½ and 3¾-inch	35 off
4-inch	39 off

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per net ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts

Carbon, 0.10 to 0.20 per cent	83 off
Carbon, 0.30 to 0.40 per cent	81 off
Carbon, 0.40 to 0.50 per cent	80 off

Plus differentials and extras for cutting

SEAMLESS STEEL LOCOMOTIVE AND SUPER-HEATER TUBES

(Effective April 19, 1923)

Outside diameter	Gage	Net prices per foot, f.o.b. Pittsburgh Price
2-inch	12-gage	15c
2-inch	11-gage	16c
2-inch	10-gage	17c
2¼-inch	12-gage	17c
2¼-inch	11-gage	18c
2¼-inch	10-gage	20c
3-inch	7-gage	35c
1½-inch	9-gage	15c
5½-inch	9-gage	55c
5½-inch	9-gage	57c

Plus usual extras for forming and for long lengths.

Mounting for worm drive rear axle made in Sivyer Electric Steel

SIVYER (S) CASTINGS

DEPENDABLE

Making truck parts more rugged and stronger

THE tendency to increase the strength and wear resistance of motor truck parts is manifesting itself not only in design, but also in the selection of metal. The cross member for a rear axle, shown above, used to be made of iron. It is now made in Sivyer Electric Steel. The Sivyer castings are preferred to ordinary steel in this case because of the nature of the casting. Its sections vary sharply. The heavy lugs are 1 7/16 inches thick while the body of the casting is only 3/8 inches. The resulting pouring requirements of the mold practically make the use of electric steel a necessity.

Send Blue Prints

A number of aggressive manufacturers have divided their steel parts into three general classes: those that can be profitably forged; those that cannot be forged economically, or at all, but can be cast in ordinary steel; and those that can be cast most reliably and economically in Sivyer Electric Steel.

The last class includes especially castings with thin and sharply varying sections, and castings that have to be true to pattern, clean and smooth in order to fit the assembly with the minimum of finishing.

With Sivyer Electric Steel we have been able to show certain engineers very decided advantages and economies, not only as against ordinary steel castings and hammered forgings, but also as against malleable castings and fabricated steel.

We are especially interested in making experimental castings for automotive manufacturers. If you will send us your blue prints for troublesome parts, together with a statement of your difficulties, we will study the problems involved and recommend possible solutions without obligation on your part.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

Composite Market Record

Monthly Averages of Fourteen Iron and Steel Products, 1913-1923, Compiled by Iron Trade Review

1923	
June 20	$46.43
June 13	46.53
June 6	46.79
Average for May	47.52
May 29	47.26
May 16	47.48
May 9	47.70
May 2	47.70
April	47.01
March	45.31
February	42.61
January	41.17
1922	
December	40.53
November	42.08
October	43.60
September	43.79
August	39.79
July	37.50
June	36.96
May	36.49
April	34.42
March	32.97
February	32.86
January	33.35
Average for year	37.86
1921	
December	33.99
November	34.71
October	35.46
September	35.34
August	35.99
July	38.14
June	41.87
May	43.32
April	43.84
March	45.37
February	48.81
January	51.98
Average for year	40.74
1920	
December	54.04
November	63.75
October	68.61
September	69.28
August	68.93
July	68.29
June	67.89
May	68.26
April	67.49
March	65.47
February	65.63
January	59.40
Average for year	65.59
1919	
December	54.88
November	51.28
October	48.76
September	48.35
August	48.27
July	47.86
June	47.88
May	48.29
April	48.45
March	52.28
February	53.71
January	53.81
Average for year	50.32
1918	
December	57.24
November	55.67
October	57.53
September	56.56
August	56.67
July	56.66
June	56.62
May	56.59
April	56.59
March	56.71
February	56.67
January	56.67
Average for year	56.68
1917	
December	56.68
November	58.29
October	67.75
September	83.18
August	89.69
July	89.56
June	82.66
May	73.96
April	66.48
March	61.07
February	56.76
January	55.10
Average for year	70.10
1916	
December	$53.68
November	46.77
October	41.50
September	39.97
August	39.67
July	38.37
June	39.63
May	39.78
April	39.13
March	37.18
February	35.63
January	33.66
Average for year	40.50
1915	
December	31.56
November	28.64
October	26.19
September	25.55
August	24.77
July	24.25
June	23.74
May	22.89
April	22.66
March	22.71
February	22.21
January	21.90
Average for year	24.76
1914	
December	$21.58
November	23.39
October	22.84
September	23.17
August	22.72
July	22.17
June	22.58
May	22.99
April	23.39
March	23.60
February	23.52
January	23.03
Average for year	22.92
1913	
December	23.29
November	24.02
October	24.91
September	25.55
August	25.97
July	26.34
June	26.78
May	27.34
April	27.74
March	27.93
February	28.05
January	27.96
Average for year	26.32

Viroqua high school, 3-story, 93 x 187 feet. One floor will be equipped as manual training shops and domestic science rooms. The cost will be $175,000 complete.

VIROQUA, WIS.—Schafer & Olson, Chippewa Falls, Wis., have taken the contract to build the new Viroqua high school at $121,518. With other work and the equipment of vocational departments the project will cost $200,000.

WAUPUN, WIS.—Plans are being drawn for the construction of cells in the north wing of the Fond du Lac state prison.

WISCONSIN RAPIDS, WIS.—The MacKinnon Mfg. Co., 717 Grand avenue, has let contracts for the remodeling of a large warehouse into a factory for making automobile bodies. Additional machinery is being purchased.

West of the Mississippi

EMERYVILLE, CAL.—The Detroit Steel Products Co., Detroit, has acquired a site here on which it plans to erect a plant.

SAN FRANCISCO—The K. B. Mfg. Co. has been incorporated with a capital stock of $50,000 to manufacture machinery.

SAN FRANCISCO.—The Edmund S. Lancaster Co. has been incorporated with a capital stock of $250,000 to manufacture and deal in machinery.

OELWEIN, IA.—Bids will be received June 27, on a 2-story high school containing a manual training department and costing $200,000. William Gordon, Hubbell Building, Des Moines, Ia., is architect.

IDA GROVE, IA.—The Ida Grove Electric Co. contemplates power house improvements costing $25,000.

MONROE, LA.—The Universal Wheel Co. has secured a charter to establish a plant to manufacture automobile, truck and bicycle rims. The capitalization of the company is $150,000.

ST. PAUL, MINN.—The State board of control is having plans drawn for a power house addition to a laundry.

ST. PETER, MINN.—The power plant of the state hospital will be improved at a cost of $100,000. Plans are being drawn.

KANSAS CITY, MO.—The Darby Boiler Works Co. plans the erection of a building, 400 x 600 feet.

ST. JOSEPH, MO.—Russell & Co., farm implements, has been incorporated with $50,000 capital stock by J. W. McClymonds, C. M. Russell and E. C. Merwin.

ST. LOUIS—The General Conveyor & Mfg. Co. has been incorporated by C. C. Mauer, John Mauer and H. J. Frisch with a capital stock of $100,000.

ST. LOUIS—The Midwest Machinery Co. has been incorporated with $10,000 capital stock by M. M. Stone, C. E. Smiley and L. T. Mart, to manufacture machinery, etc.

ST. LOUIS—The Metal Ceiling Co. has been incorporated with $10,000 capital stock by E. C. Grenzebach, Albert Wiebe and Conrad Paeben to manufacture and erect sheet metal.

PORTLAND, OREG.—G. W. S. Grinding & Machine Works has been incorporated by W. S. Asher, Lewis building, with a capital of $10,000.

SAN ANTONIO, TEX.—William A. Durr, Monterey, Mex. and others are organizing a company with $100,000 stock to establish a plant for the manufacture of lead pipe and sheet lead products.

SEATTLE.—The Seaboard Portland Cement Co., capitalized at $3,000,000, has been formed by J. K. McDowall and H. Schroder.

SEATTLE—The Garlate Iron & Chain Co. has been incorporated by F. L. Heisrich, Fred Berger and Jacob Mades with a capital stock of $5000.

SPOKANE, WASH.—Construction of an oil refinery with a daily capacity of 1000 barrels has been started by the Hursh-Sinclair Refining Co.

SPOKANE, WASH.—The Enterprise Mfg. Co., has been incorporated with a capital stock of $100,000 by George Torreson, L. J. Kimmel and A. E. Knight to deal in ice machines and heating systems.

TEKOA, WASH.—The Liberty Butte Iron Co. has been incorporated with a capital stock of $500,000.

CASPER, WYO.—The Natrona Power Co. has awarded contracts for the construction of a plant.

Business in Canada

DRUMHELLER, ALTA.—Dirigible Headlights, Ltd., has been incorporated to manufacture automobile headlights and carry on business as mechanical engineers, machinist, founder, etc., with $1,000,000 capital stock, by Charles W. Perry, James E. Feasley and Hilliard C. McConkey of Drumheller and others.

BANCROFT, ONT.—The Bancroft Light, Heat & Power Co., Ltd., has been incorporated to build and operate electric power plants, etc., with $1,000,000 capital stock; by Donald L. Cameron, John R. Hoidge, Samuel Young and others all of Toronto, as provisional directors.

BELLEVILLE, ONT.—The Sampson Rubber Co., Ltd., has been incorporated to manufacture rubber, automobile tires, tubes, etc., with $300,000 capital stock; by William E. Wheatley, Peter McN. Bennie, Richard A. Bull and others.

RIDGETOWN, ONT.—The Ridgetown Machine Co., Ltd., has been incorporated to manufacture threshing and other machines and engage in general foundry and machine work; with $4000 capital stock; provisional directors are John T. Sales, William A. Smith and Samuel Poor Jr. of Ridgetown.

TORONTO, ONT.—The Concrete Units, Ltd., has been incorporated to manufacture cement, cement products, etc., with $40,000 capital stock; by Andrew T. Clark, David Forgan, Colin S. Grasett and others.

TORONTO, ONT.—E. P. Muntz Engineering Co., Inc., has been incorporated with $40,000 capital stock. Provisional directors are Donald H. Rowman, Leonard A. Richard and Isabella V. Kerry, Toronto.

The Press, published in Cleveland, is one of the largest and most widely read of all Ohio newspapers.

STEEL BUSINESS BOOMING

New Records Expected Within a Short Time

Steel production is swinging into a record-breaking stride and this accomplishment in the face of labor shortage and uncertain transportation presents a true index to the high pressure of consumptive demand, according to the Iron Trade Review.

February showed the highest rate of steel ingot production for that month since official monthly records first were compiled about six years ago. While the total output for February was less than January because of the shorter operating period, the daily average was higher, showing 139,000 tons against 137,637 tons.

Iron Trade Review composite of 14 leading iron and steel products is now at the highest point for any weekly period since March 16, 1921. This week the

400 Newspapers Regularly Quote

IRON TRADE REVIEW

CLEVELAND

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THE IRON TRADE REVIEW

"The Most Widely Quoted Trade Paper In The World"

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	15.00 to 16.00
Boston (dealers)	14.00 to 14.50
Buffalo	20.00 to 20.50
Chicago	17.50 to 18.00
Cleveland	18.00 to 18.50
Cincinnati	16.00 to 16.50
Detroit (dealers)	16.00 to 16.50
Eastern Pennsylvania	17.50 to 18.50
New York (dealers)	14.00 to 14.50
Pittsburgh	20.00 to 20.50
St. Louis	17.00 to 17.50
Valleys (nominal)	20.75 to 21.00
No. 1 railroad steel New York (dealers)	14.50 to 15.00

BUNDLED SHEETS

Buffalo	$16.25 to 16.75
Cleveland	12.75 to 13.00
Cincinnati	12.50 to 13.00
Detroit	13.50 to 14.00
Eastern Pennsylvania	16.00 to 16.50
Pittsburgh	18.00 to 18.50
St. Louis	11.50 to 12.00
Valleys	15.00 to 15.50

STEEL RAILS, SHORT

Birmingham	17.50 to 18.00
Boston (dealers)	14.50 to 15.00
Chicago	20.00 to 20.50
Cincinnati	22.00 to 23.00
Cleveland	17.00 to 17.25
St. Louis	18.00 to 18.50

STOVE PLATE

Birmingham	15.00 to 16.00
Boston	17.00 to 18.00
Buffalo	20.00 to 21.00
Chicago	17.00 to 17.50
Cincinnati (net tons)	11.00 to 11.50
Cleveland	16.00 to 16.25
Detroit (net ton) (dealers)	15.00 to 16.00
Eastern Pennsylvania	17.00 to 18.00
New York (dealers)	13.00 to 13.50
Pittsburgh	16.00 to 16.50
St. Louis	15.00 to 15.50

LOW PHOSPHORUS

Buffalo	26.00 to 27.00
Cincinnati	16.00 to 17.00
Eastern Pennsylvania	25.00 to 26.00
Pitts. billets and bloom crops	25.00 to 25.50

SHOVELING STEEL

Chicago	17.25 to 17.75
Pittsburgh	16.50 to 17.00
St. Louis	16.50 to 17.00

KNUCKLES, COUPLERS & SPRINGS

Chicago	22.00 to 22.50
Eastern Pennsylvania	24.00 to 25.00
Pittsburgh	22.50 to 23.00
St. Louis	22.50 to 23.00

COMPRESSED SHEETS

Buffalo	19.50 to 20.50
Chicago	15.50 to 16.00
Pittsburgh	18.00 to 18.50
Cleveland	16.00 to 16.50
Detroit (dealers)	15.00 to 15.50
Valleys	19.00 to 19.50

FROGS, SWITCHES, GUARDS

Chicago	17.50 to 18.00
Eastern Pennsylvania	17.50 to 18.50
St. Louis	16.50 to 17.00

BOILER PLATE, CUT

St. Louis	11.50 to 12.00

ANGLE BARS—STEEL

Chicago	18.50 to 19.00
St. Louis	18.00 to 18.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	15.00 to 15.50
Boston (dealers)	17.00 to 18.00
Buffalo	20.00 to 21.00
Chicago, No. 1	16.75 to 17.25
Chicago, No. 2	17.50 to 18.00
Cincinnati No. 1	14.00 to 14.50
Eastern Pennsylvania	21.00 to 22.00
Pittsburgh, No. 1	20.00 to 20.50
Pittsburgh No. 2	20.00 to 20.50
New York, No. 1 (dealers)	19.00 to 19.50
St. Louis, No. 1	17.00 to 17.50
St. Louis, No. 2	16.50 to 17.00

WROUGHT PIPE

Boston (dealers)	9.50 to 10.00
Buffalo	17.00 to 18.00
Eastern Pennsylvania	14.50 to 15.00
New York (dealers)	11.00 to 11.50

YARD WROUGHT

Boston	14.00 to 14.50
Eastern Pennsylvania	19.00 to 20.00

CITY WROUGHT

New York, long	$17.00 to 17.50

BUSHELING

Buffalo, No. 1	19.00 to 20.00
Chicago, No. 1	16.25 to 16.75
Chicago, No. 2	12.50 to 13.00
Cincinnati No. 1	12.50 to 13.00
Cleveland, No. 1	15.75 to 16.00
Cleveland, No. 2	11.50 to 12.00
Detroit, No. 1	14.00 to 15.00
Detroit, No. 2 (new)	13.00 to 14.00
Detroit, No. 2 (old)	12.00 to 12.50
Eastern Pennsylvania	20.00 to 21.00
Pittsburgh, No. 1	16.50 to 17.00
St. Louis No. 1	16.00 to 16.50

MACHINE SHOP TURNINGS

Birmingham	9.00 to 10.00
Boston (dealers)	11.00 to 11.50
Buffalo	16.00 to 17.00
Chicago	11.00 to 11.50
Cleveland	15.75 to 16.00
Cincinnati (net tons)	10.00 to 10.50
Detroit (dealers)	12.00 to 12.50
Eastern Pennsylvania	16.00 to 16.50
New York (dealers)	12.50 to 13.00
Pittsburgh	16.00 to 16.50
St. Louis	12.00 to 12.50
Valleys	16.50 to 17.00

CAST IRON BORINGS

Birmingham (chemical	16.00 to 17.00
Birmingham (plain)	10.00 to 11.00
Boston (chemical)	14.50 to 15.00
Boston (dealers)	13.00 to 13.50
Buffalo	16.00 to 17.00
Chicago	14.00 to 14.50
Cincinnati (net tons)	10.50 to 11.00
Cleveland	16.25 to 16.50
Detroit (dealers)	13.00 to 13.50
Eastern Pennsylvania	16.50 to 17.00
Eastern Pennsylvania (chem.)	20.00 to 21.00
Pittsburgh	16.50 to 17.00
New York (dealers' price)	13.50 to 14.00
St. Louis	13.50 to 14.00
Valleys	17.50 to 17.75

MIXED BORINGS AND TURNINGS
(For blast furnace use)

Boston (dealers)	11.00 to 11.50
Cleveland	16.00 to 16.25
Detroit (dealers)	12.50 to 13.00
Eastern Pennsylvania	16.00
New York (dealers)	12.50 to 13.00

IRON AXLES

Birmingham	25.00 to 26.00
Boston (consumers)	31.00 to 32.00
Buffalo	30.00 to 31.00
Chicago	29.00 to 29.50
Cincinnati	24.00 to 25.00
Eastern Pennsylvania	nominal
New York (dealers)	27.00 to 28.00
St. Louis	27.00 to 27.50

IRON RAILS

Buffalo	$23.00 to 23.50
Chicago	22.00 to 22.50
Cincinnati	14.50 to 15.00
St. Louis	18.50 to 19.00

PIPES AND FLUES

Chicago	12.50 to 13.00
Cincinnati	11.50 to 12.00
Cleveland	12.50 to 13.00
St. Louis	12.75 to 13.25

RAILROAD GRATE BARS

Buffalo	18.00 to 19.00
Chicago	16.25 to 16.75
Cleveland	16.00 to 16.25
Eastern Pennsylvania	17.50 to 18.00
New York (dealers)	13.50 to 14.00
St. Louis	15.50 to 16.00

FORGE FLASHINGS

Boston (dealers)	13.00 to 13.50
Chicago, small	12.50 to 13.00
Cleveland, small	15.25 to 15.50
Cleveland, large	15.00 to 15.25
Detroit (dealers)	12.00 to 12.50

FORGE SCRAP

Boston (dealers)	12.75 to 13.00
Chicago	17.50 to 18.00
Eastern Pennsylvania	17.00 to 18.00

ARCH BARS AND TRANSOMS

Chicago	25.00 to 25.50
St. Louis	24.00 to 25.00

ANGLE BARS—IRON

Chicago	25.00 to 25.50
St. Louis	24.00 to 24.50

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	13.00 to 14.00
Buffalo	22.50 to 23.00
Chicago	15.00 to 15.50
Cleveland	17.00 to 17.50
Eastern Pennsylvania	19.00 to 20.00
Pittsburgh	17.50 to 18.00
St. Louis	13.50 to 14.00

STEEL CAR AXLES

Birmingham	22.00 to 23.00
Boston (consumers)	24.00 to 25.00
Buffalo	24.50 to 25.50
Chicago	22.50 to 23.00
Cleveland	24.00 to 25.00
Eastern Pennsylvania	nominal
New York (dealers)	nominal
Pittsburgh	24.00 to 24.50
St. Louis	22.00 to 22.50

SHAFTING

Boston (consumers)	23.00 to 23.50
Chicago	24.00 to 24.50
Eastern Pennsylvania	24.00 to 25.00
New York (dealers)	21.50 to 22.00
St. Louis	22.50 to 23.00

Iron Foundry Scrap

CAR WHEELS

Birmingham, tram car	20.00 to 21.00
Birmingham, iron	19.00 to 20.00
Boston (consumers)	22.00 to 23.00
Buffalo, iron	21.00 to 22.00
Chicago, iron	21.00 to 21.50
Cincinnati	17.00 to 17.50
Eastern Pennsylvania	22.00 to 24.00
New York iron (dealers)	18.00 to 19.00
Pittsburgh, iron	22.00 to 22.50
Pittsburgh, steel	22.00 to 22.50
St. Louis, iron	20.00 to 20.50

NO. 1 CAST SCRAP

Birmingham, cupola	20.00 to 20.50
Boston (consumers)	23.50 to 24.00
Buffalo	23.00 to 24.00
Chicago, cupola	23.75 to 24.25
Cincinnati No. 1. machinery cupola (net tons)	21.50 to 22.00
Cleveland, cupola	22.00 to 23.00
Detroit (net ton) (dealers)	18.00 to 19.00
Eastern Pennsylvania, cupola	22.00 to 23.00
New York, cupola (dealers)	19.00 to 20.00
Pittsburgh, cupola	23.50 to 24.00
San Francisco	26.00 to 28.00
St. Louis, railroad	20.50 to 21.00
St. Louis, agricultural	20.50 to 21.00
Valleys	22.50 to 23.00

HEAVY CAST

Boston (consumers)	20.00 to 21.00
Buffalo	18.00 to 19.00
Cleveland	15.00 to 15.50
Detroit (automobile) (net ton)	22.00 to 22.50
Eastern Pennsylvania	18.00 to 19.00
New York (dealers)	18.00 to 19.00
Pittsburgh	17.50 to 18.00

MALLEABLE

Boston (railroad) (consumers)	24.00 to 25.00
Buffalo	24.00 to 25.00
Chicago, railroad	23.50 to 24.00
Chicago, agricultural	22.50 to 23.00
Cincinnati, agricultural	17.50 to 18.00
Cincinnati, railroad	19.50 to 20.00
Cleveland, agricultural	22.00 to 22.50
Cleveland, railroad, nominal	25.00 to 25.50
Detroit (dealers)	22.00 to 23.00
Eastern Pennsylvania, railroad	22.00 to 23.00
Pittsburgh, railroad	23.00 to 24.00
St. Louis, agricultural	19.00 to 19.50
St. Louis, railroad	19.50 to 20.00

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	18.50 to 20.00
Boston (dealers)	16.50 to 17.00
Chicago	19.00 to 19.50
Cleveland	20.50 to 21.00
Detroit	16.00 to 16.50
Eastern Pennsylvania	20.00 to 21.00
New York (dealers)	20.00 to 20.50
Pittsburgh district	21.50 to 22.00
St. Louis	17.50 to 18.00

LOCOMOTIVE TIRES

Chicago	17.50 to 18.00
St. Louis	18.00 to 18.50

LOW PHOSPHORUS PUNCHINGS

Chicago	19.50 to 20.00
Eastern Pennsylvania	26.00 to 28.00
Pittsburgh	24.50 to 25.00

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by

Stephen L. Goodale, Ph. B., M. E., M. A.

294 Pages—4 x 6¾

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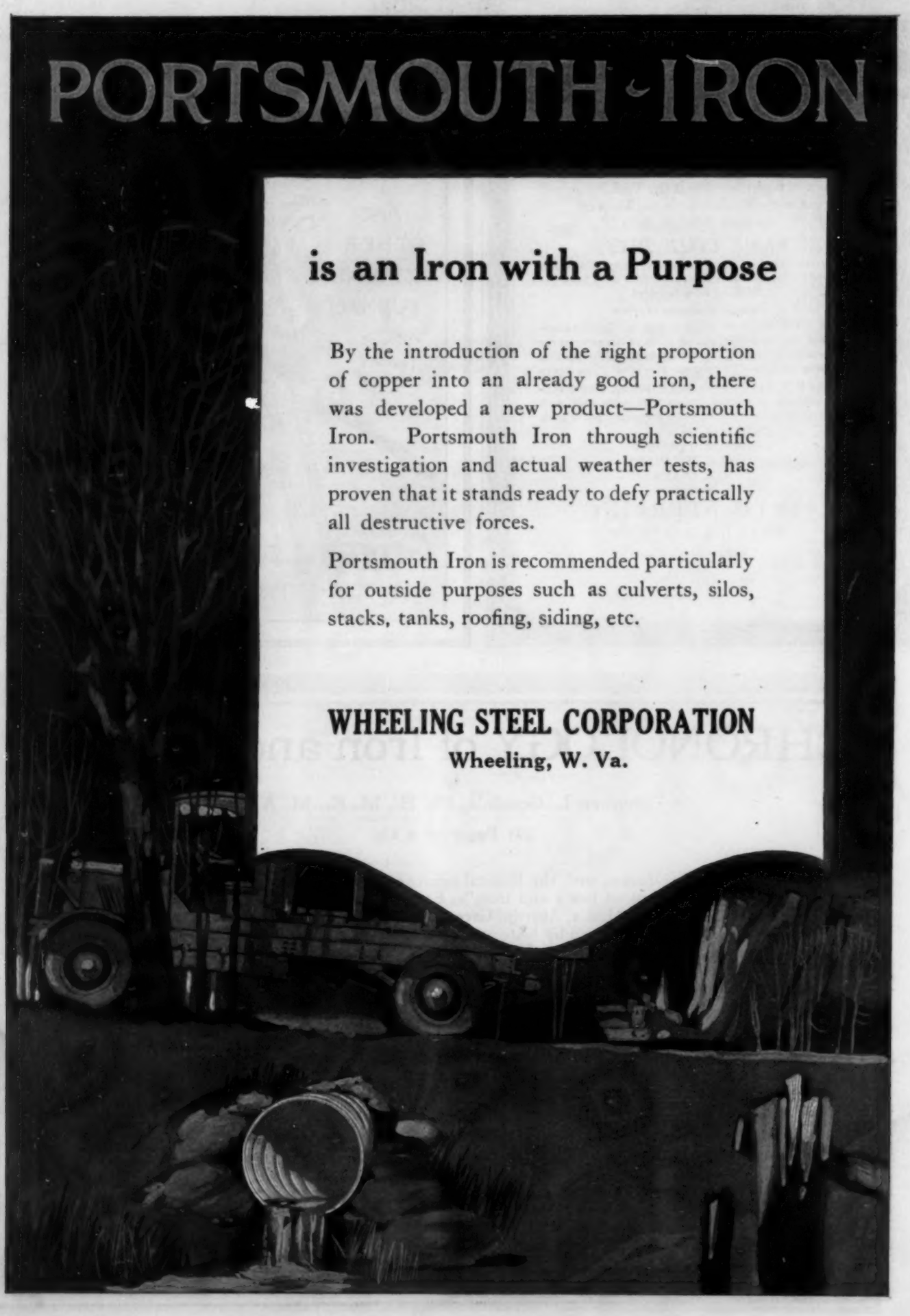

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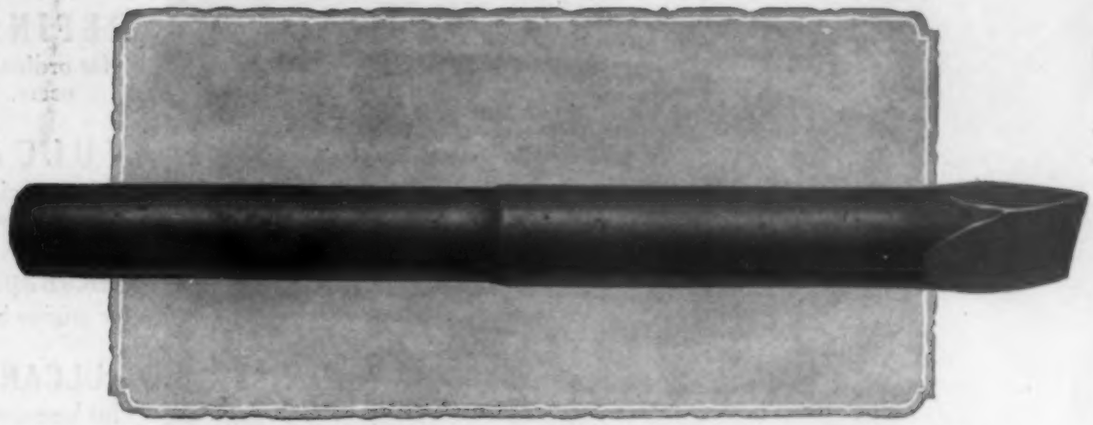

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for locomotive stay bolts.

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The result is good—the product will serve you well.

Open Hearth Alloy Steel Ingots, Billets, Bars
Wire Rods, Wire Nails, Rivets and Cut Tacks
Iron Bars and Railroad Tie Plates

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104 South Michigan Avenue
CHICAGO

Interstate Steels

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for ordinary users.

VULCAN
for special purposes.

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Iron Bars and Railroad Tie Plates

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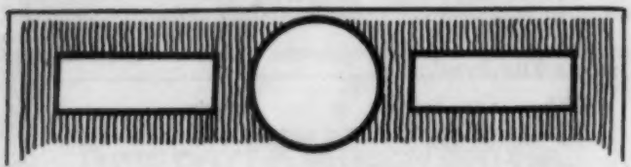

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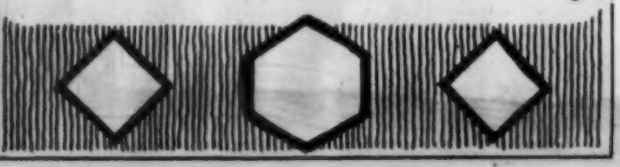

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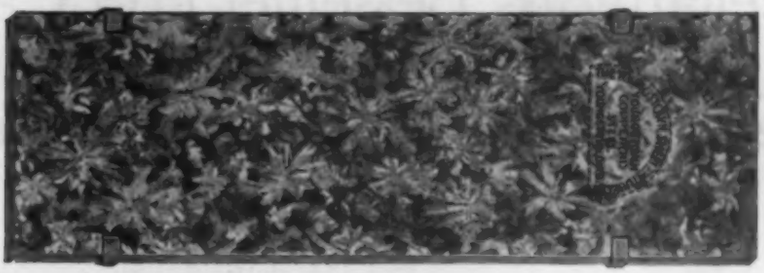

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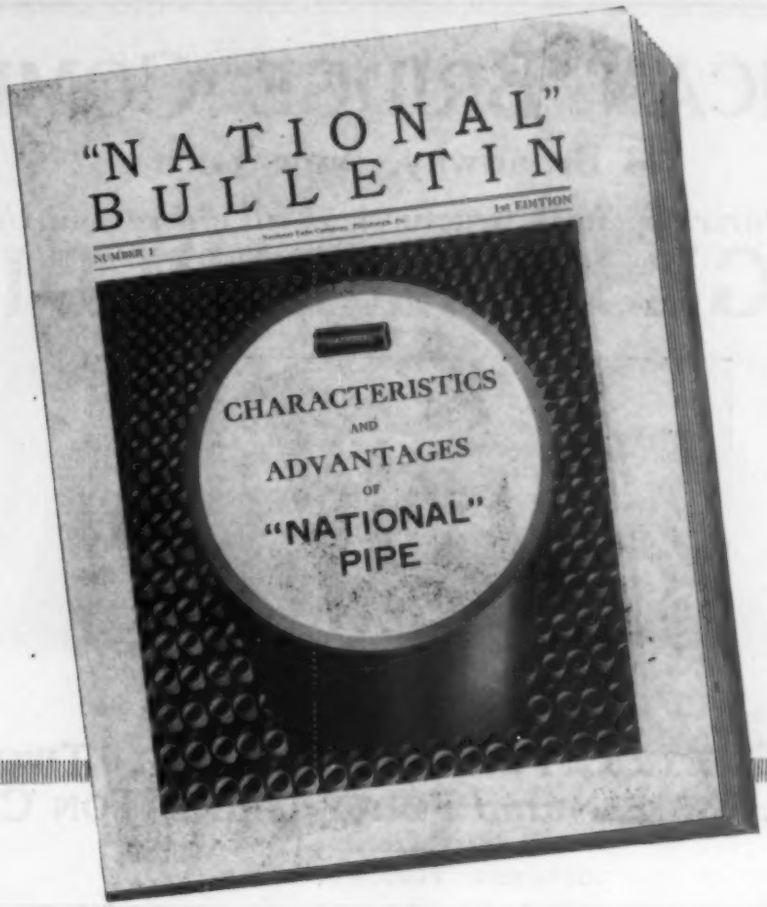

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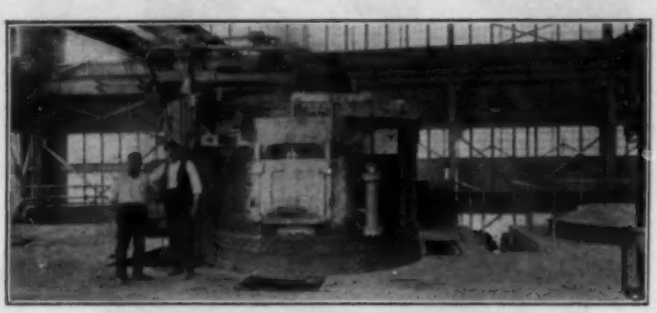

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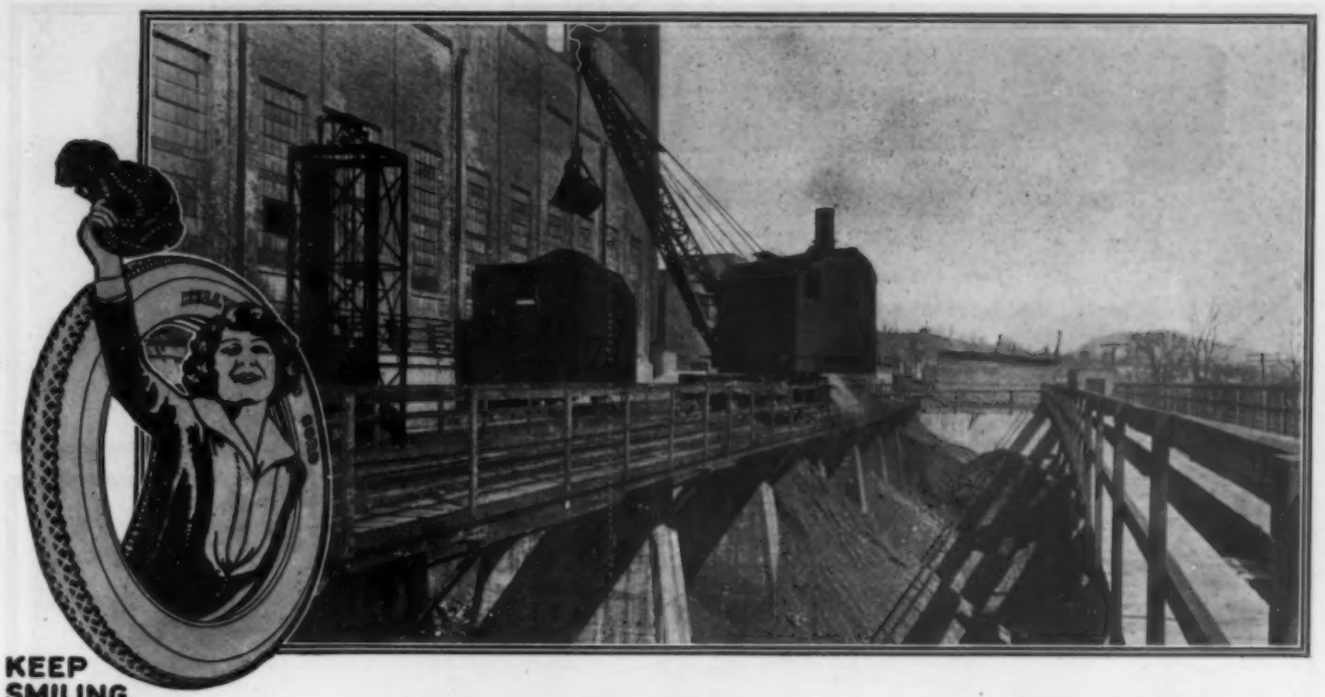

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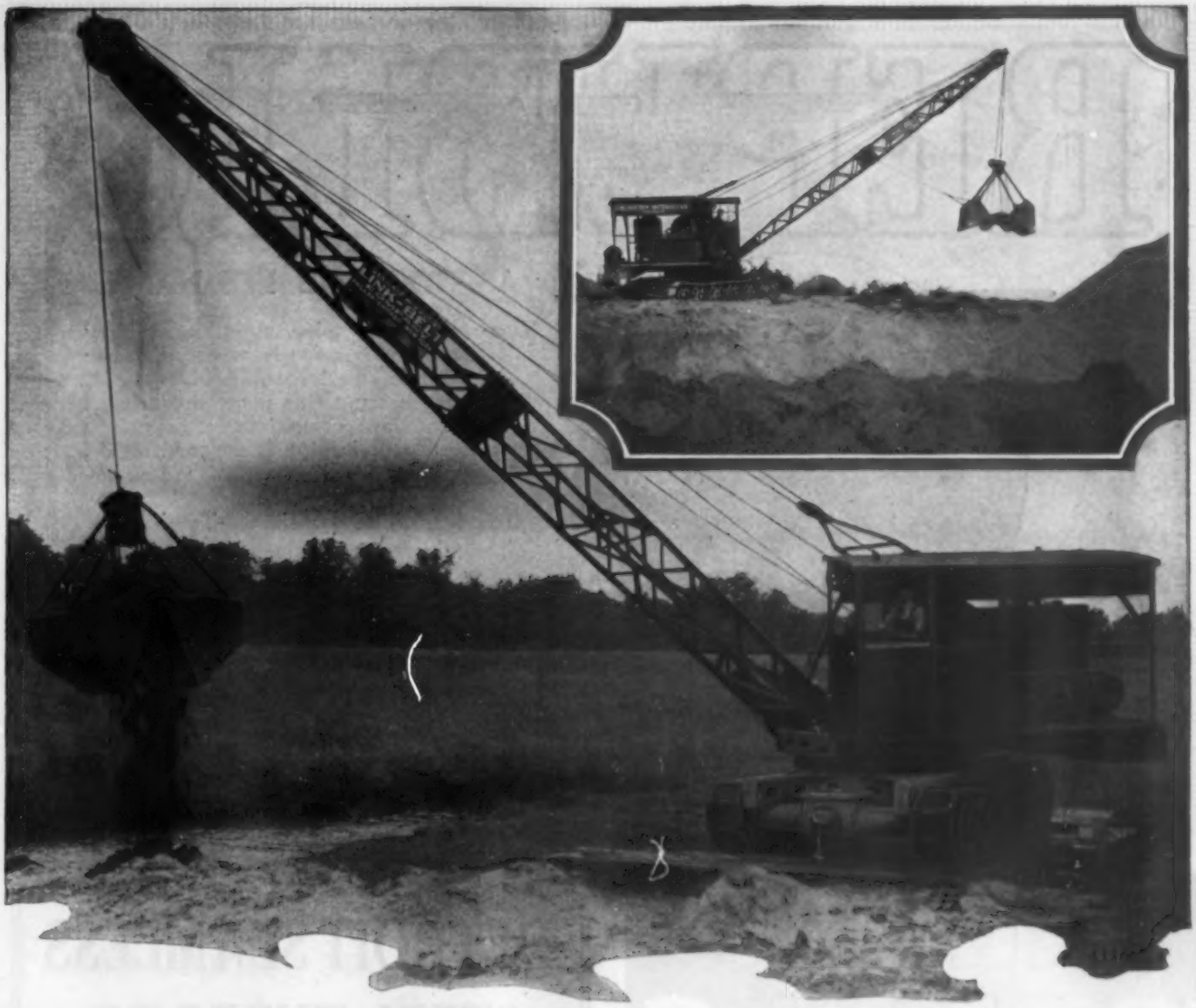

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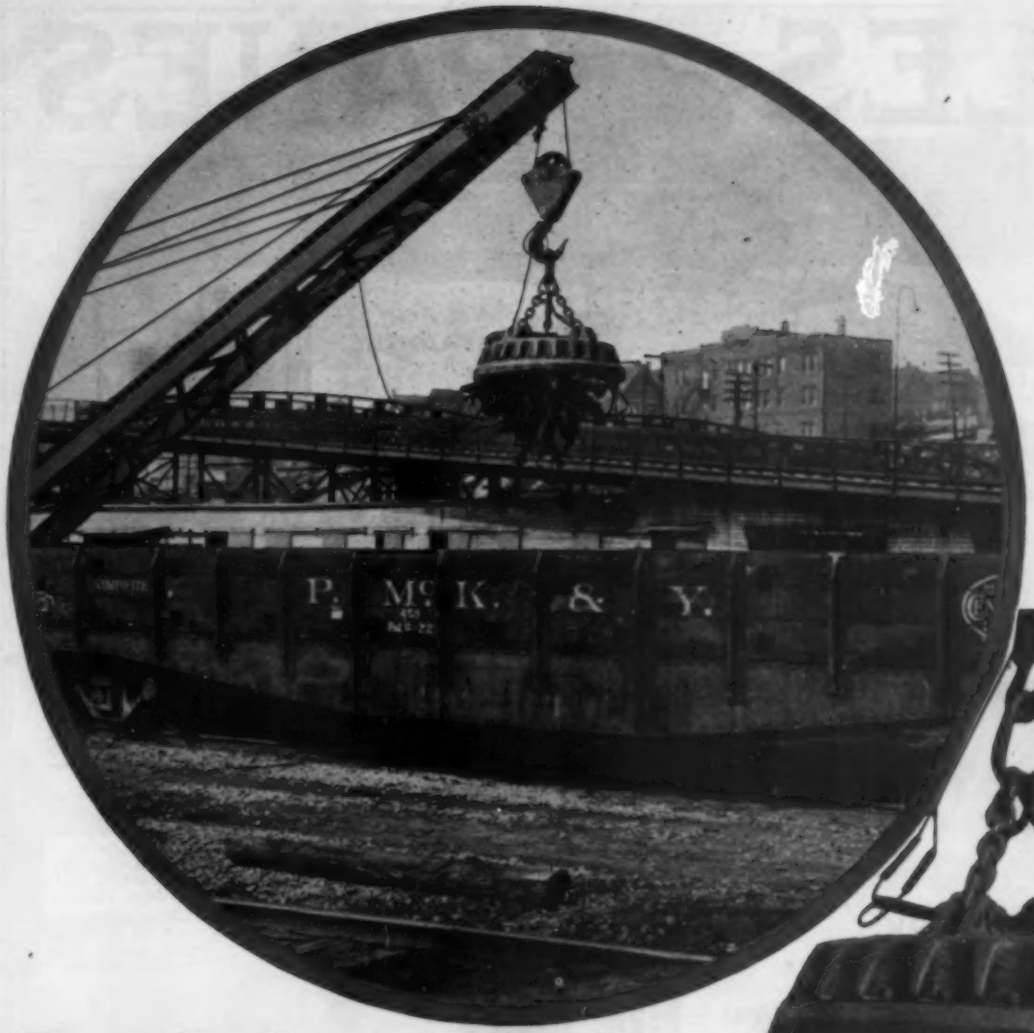

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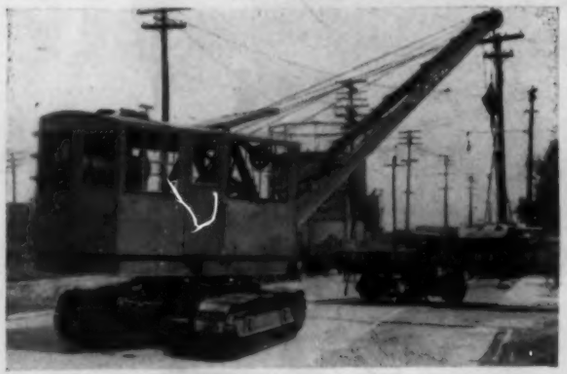

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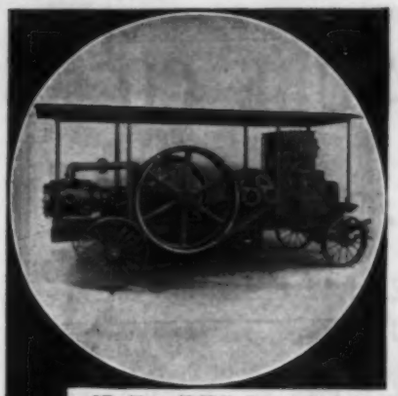

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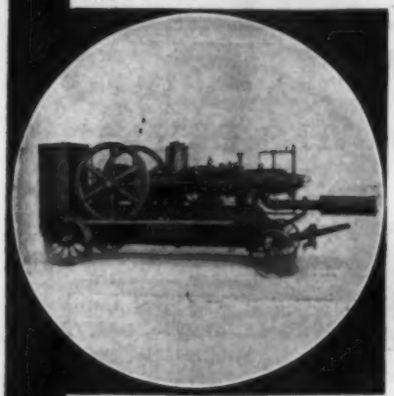

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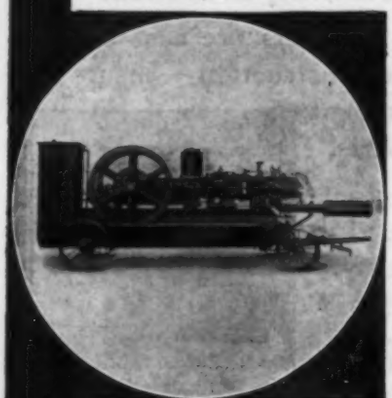

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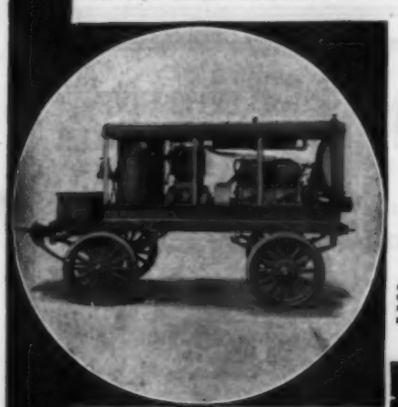

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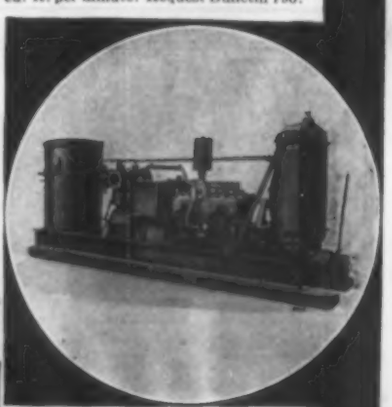

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J-110

ROTARY PNEUMATIC HAMMERS · LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS · CHICAGO PNEUMATIC AIR COMPRESSORS · VACUUM PUMPS · PNEUMATIC HOISTS · GIANT OIL AND GAS ENGINES · ROCK DRILLS · COAL DRILLS

CHICAGO PNEUMATIC
The Compressor with the Simplate Valve

2402

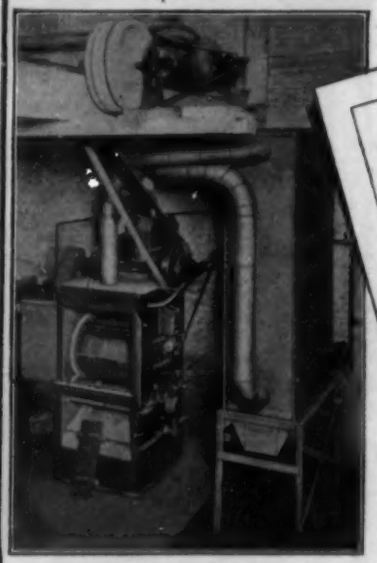
THE BABCOCK & WILCOX TUBE CO.

(PITTSBURGH SEAMLESS TUBE CO.)

BEAVER FALLS, PA.

MANUFACTURERS OF COLD DRAWN SEAMLESS STEEL BOILER AND MECHANICAL TUBES

PROMPT DELIVERIES **UP TO 5.5 INCHES OUTSIDE DIAMETER** ***PROMPT DELIVERIES***



This bulletin describes sand blast barrels of both the gravity and pressure type, with special reference to economy of production and durable construction. Write for it.

Castings cleaned by sand blasting machine easier, bring higher prices, and are specified by many buyers.

A No. 1 Barrel, 20 x 34 inch drum, (shown above with dust arrester and fan) would enable you to meet this demand and turn out work equal to the best.

The American Foundry Equipment Co.

Madison Ave. and 46th St., New York

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CLEVELAND

CLOSE QUARTER DRILLS

Made in 2 Sizes 38 and 49 with No. 3 and No. 4 M. T. Sockets

Will Drill Closer to Wall or Corner Than Any Drill Made

The body and cylinders are cast en-bloc — one-piece-construction — insuring perfect alignment of all working parts.

The V-shaped front-head makes the drilling in corners easy.

Write for Bulletin No. 49

BRANCH OFFICES IN ALL THE LARGE CITIES

The Cleveland Pneumatic Tool Co.

Cleveland, Ohio, U. S. A.

SIMPSON

INTENSIVE FOUNDRY MIXER

Economical and Efficient for all kinds of Foundry Sand Mixtures

also or preparation of daubing to line furnaces, ovens, cupolas, etc.

It is strong and sturdy and requires the minimum operating and upkeep expense. Automatic discharge. Made in four sizes.

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NATIONAL ENGINEERING CO.

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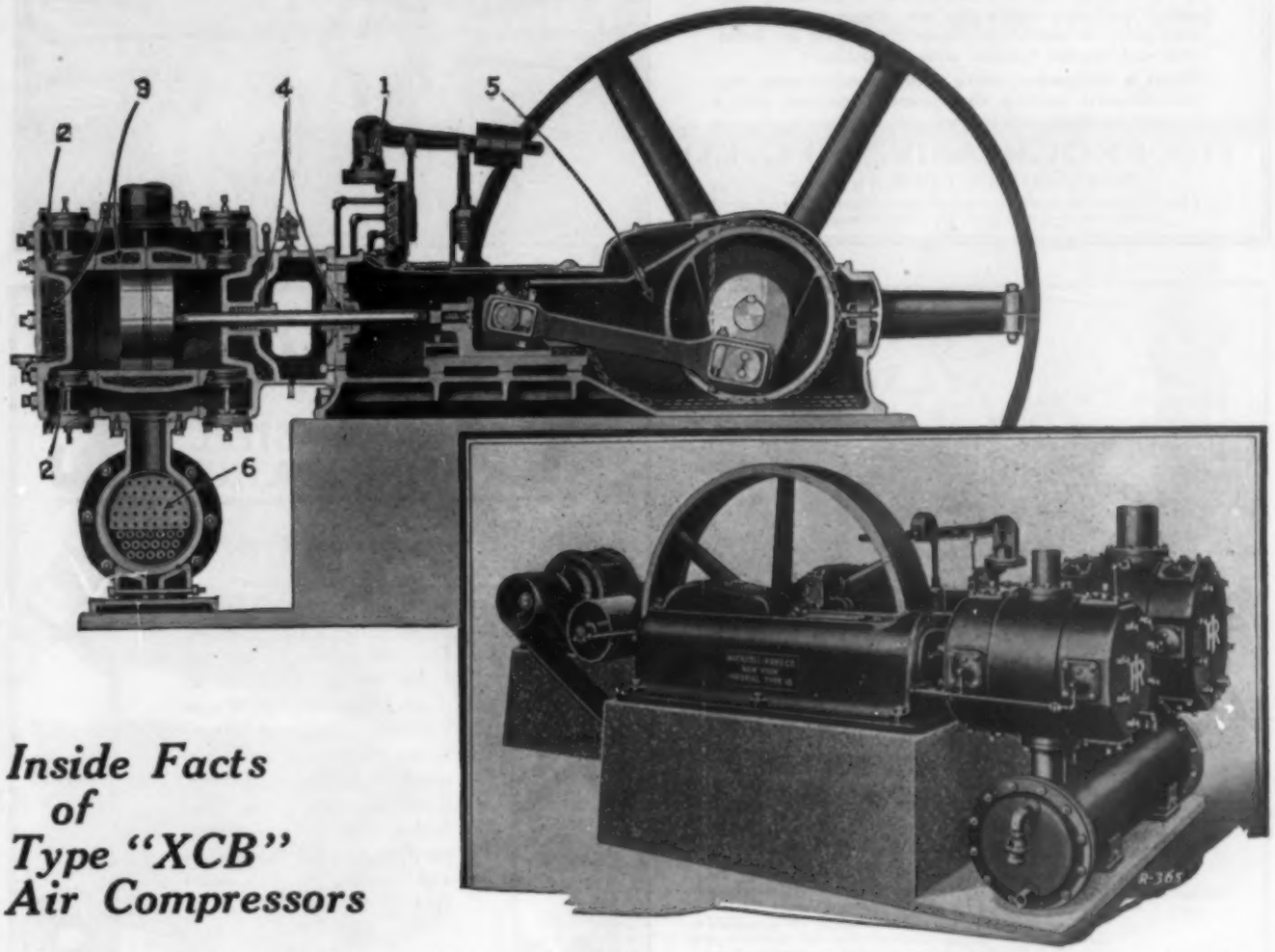
The Air Compressor with the 5-Step Clearance Control



Inside Facts of Type "XCB" Air Compressors

1.—5-Step Clearance Control which causes the compressor to operate automatically at any one of five load points, viz., full, three-quarter, one-half, one-quarter and no load.

2.—Ingersoll-Rand Plate Valves for intake and discharge.

3.—Completely water-jacketed cylinder barrels and heads.

4.—Two stuffing boxes—the extra stuffer in the frame prevents heavy crank case oil from working along the piston rods and into the air cylinder.

5.—Completely enclosed frame construction with removable covers permitting flood lubrication for main bearings, crosshead and crank pins and crosshead guides. A force-feed lubricator oils the air cylinders.

6.—Efficient intercooler for cooling the air between stages. The nest of cooler tubes can be removed for cleaning and inspection.

Send for your copy of Bulletin 3042.

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595-C

Ingersoll-Rand

Machine Screws

SQUARE AND HEXAGON NUTS

"Promco" Quality Brands

With every facility for producing a quality article and a development of a service that is unique, is only one of the many reasons for our suggesting that it may prove of benefit to you to investigate our products and become familiar with our policy.

When in the market, write us for an estimate on your requirements stating the quantity desired and a prompt estimate will be sent you.

THE PROGRESSIVE MFG. CO.

TORRINGTON, CONN., U. S. A.

The illustration indicates a few of the many special parts that we have developed for other manufacturers.

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Established 1883

Cushion the Shocks on 75% of the Bicycle and Motorcycle Saddles of this Country

For pleasure, or for the hardest kind of work, Raymond Springs always give utmost service—in efficiency, reliability and economy.

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Established 1863

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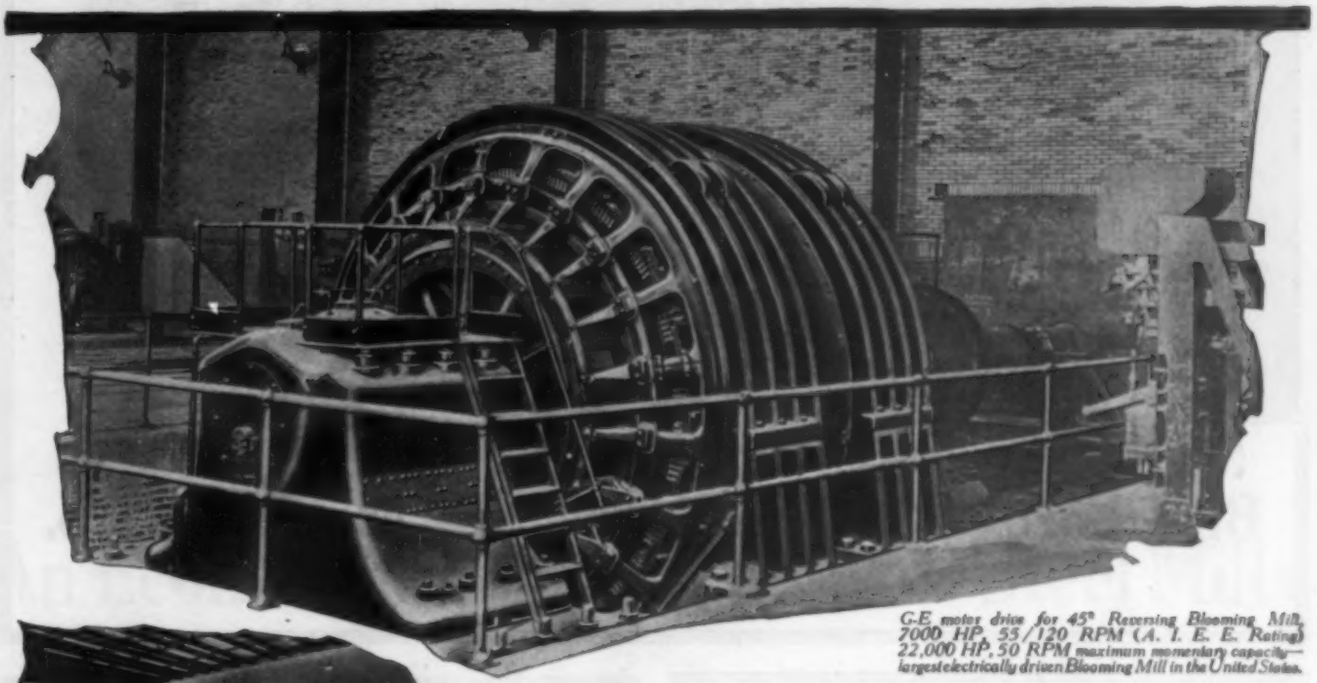
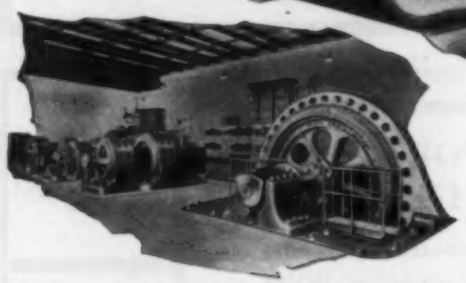
PHOENIX ROLL WORKS

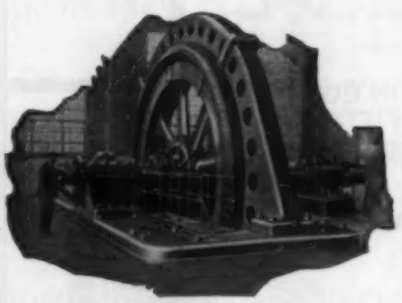
Electric motor drive for main rolls is the choice of modern steel plants because it gives the most efficient service



G-E motor drive for 45" Reversing Blooming Mill, 7000 HP, 55/120 RPM (A. I. E. E. Rating) 22,000 HP, 50 RPM maximum momentary capacity—largest electrically driven Blooming Mill in the United States.



G-E adjustable speed motor rated 1800/1500/1200 HP, 240/200/160RPM—driving finishing stands in 10" Hoop Mill.



G-E motor—2500 HP, 82 RPM, 6600 Volt—with breakable end thrust driving Roughing Rolls in Structural Mill.

G-E motors—true as steel

IN the leading steel mills operating main rolls with G-E motors and control devices, costs reduced through increased tonnage—lower maintenance charges—quality improved through better control, are actual performance records which show the advantages of installing G-E equipment.

The requirements of main roll drives which are being successfully met by G-E motors and control are:

Constant Speed Mills for sheet and plate mills—driven by single speed motors, usually of induction type.

Adjustable Speed Mills for strip mills and merchant mills—driven by adjustable speed induction motors with either Scherbius or rotary converter control, or by direct current motors with Ward-Leonard or motor field control.

Reversing mills—driven by direct current motors with Ward-Leonard control, or with combination of Ward-Leonard and motor field control.

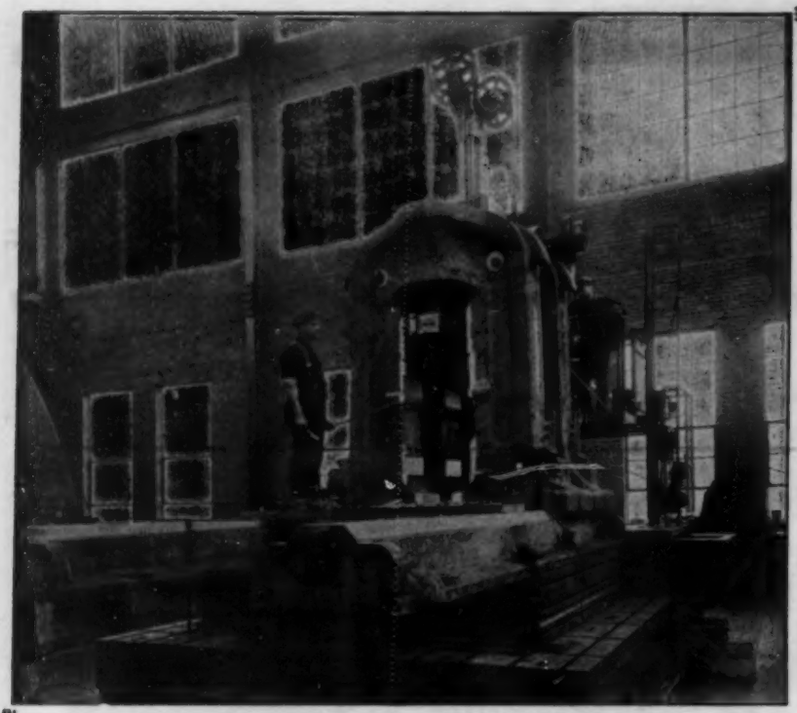
The choice of the particular type of drive for any steel mill can best be determined after consideration of the factors affecting the problem by steel mill specialists of the General Electric Company. Ask our nearest office for co-operation which will be gladly given.

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

43B-365



Morton Draw-Cut Traveling Head Planer machining two Sheet Mill Housings together.

Rolling Mill Machinery

2—Sheet Mill Housings, 30-ton, being machined on shoe plates at one setting.

The illustration will give you an idea of our capacity for large work. We have facilities for iron and steel castings weighing up to 60 tons each, and can plane castings up to 15' width, and turn and bore castings up to 25' diameter.

We specialize on rolling mill and blast furnace work.

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Easy to move—definite temperature control—low gravity fuel—low operating cost.

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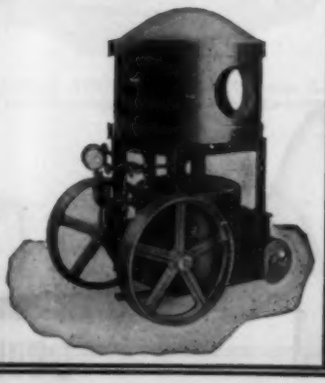
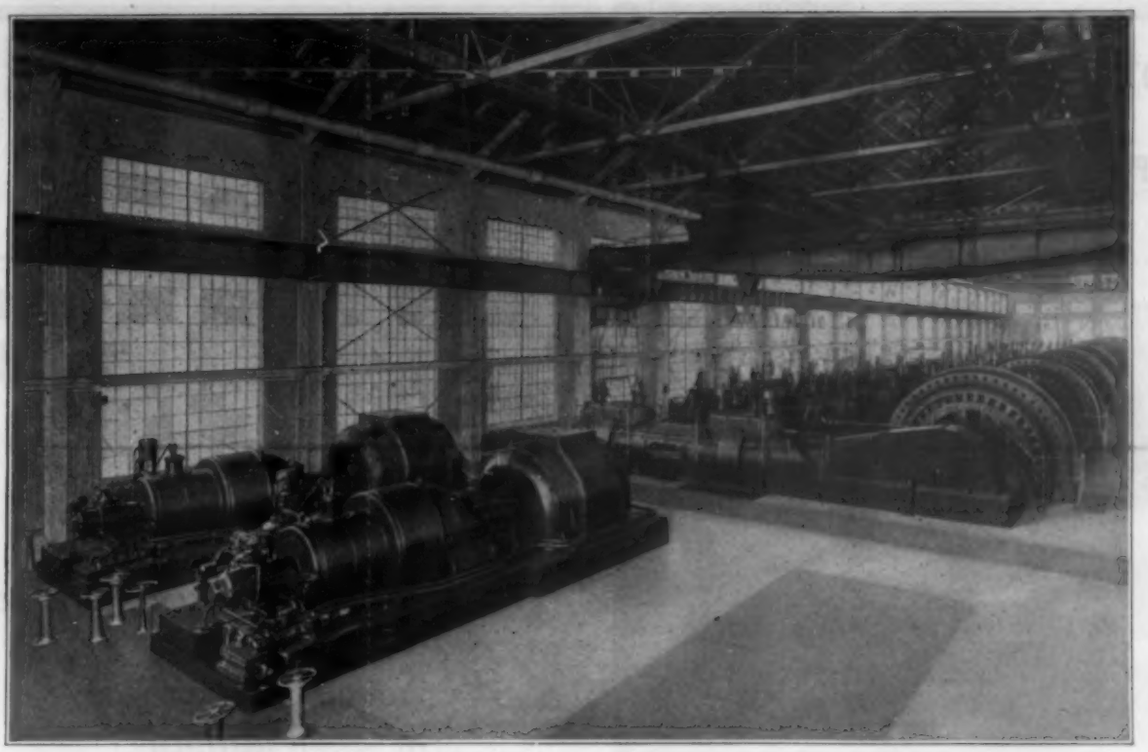


Take the furnace to the job.



An Economical Power Plant for Steel Mills

The combination of Steam Turbines and Gas Engines gives a very economical solution of the power problem for steel mills.

The Gas Engine Units operate at a high load factor, with minimum B.T.U. per K.W. hour, while the steam plant takes the peak loads.

The illustration shows one of the most recent combination steam and gas plants. Allis-Chalmers Power Units are used throughout; the Engines, Turbines and Generators having been furnished under the Allis-Chalmers plan of "Complete Equipment with Undivided Responsibility."

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- Condensers
- Hydraulic Turbines
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- Centrifugal Pumps
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- Oil Engines
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- Crushing and Cement Machy.
- Flour Mill Machinery
- Saw Mill Machinery
- Air Compressors
- Air Brakes
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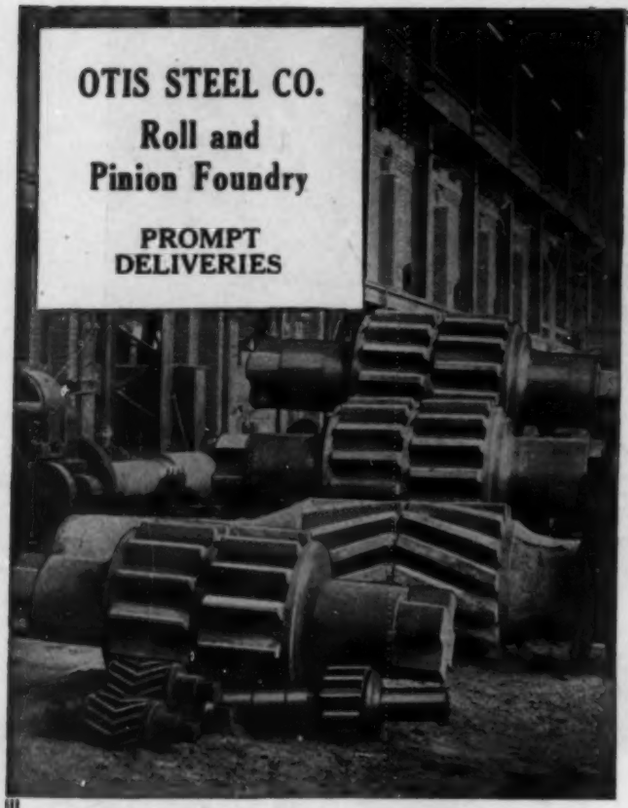
- Farm Tractors
- Power Transmission Machinery
- Perforated Metal
- Timber Treating and Preserving Machinery

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.



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Roll and
Pinion Foundry

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PINIONS
Cut or Cast Teeth

Otis Mill Pinions hold the
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We Solicit Your Orders
for same quality.

THE OTIS STEEL CO., Cleveland, Ohio
Makers of Steel Castings, from 1 lb. to 150,000 lbs. each. Rolled Steel Plates and Blue Annealed Sheets

Rolling Mill Jim Says—

Say Fellas;

Don't forget that
Better Rolls mean
Better Steel—and that
HUBBARD ROLLS
can't be beat.

S'Long

Rolling Mill Jim.—

Hubbard Steel Foundry Co.
EAST CHICAGO, IND.
All Kinds of Iron and Steel Rolls and Steel Castings

STANDARD
ENGINEERING CO.
Ellwood City Pennsylvania

Designers and Manufacturers
of
Tube Mill Machinery
seamless and welded

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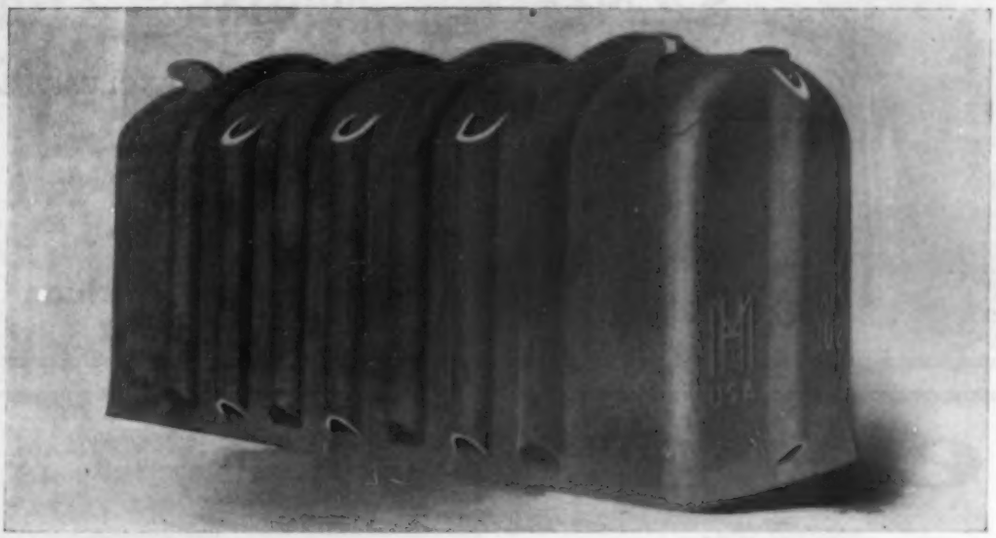
sand and chilled

Pipe Threading Machinery

Castings
gray iron, semi-steel, cupola
and air furnace

Machine Work to Drawings

Write for Bulletins



ANNEALING BOXES AND BOTTOMS

The primary purpose of the Annealing Box is to exclude air from the sheets and thus prevent oxidation. To secure this requires a box properly designed, of the best material, to withstand the maximum number of heats without cracking or changing its original shape.

It is also apparent that the metallurgy of the box is of utmost importance. Unless oxidation is reduced to a minimum and a metal provided which is not porous, it will fail to stand up under the heating and cooling conditions of Annealing Practice. This would mean improper annealing results and a short lived box.

Mackintosh-Hemphill Annealing Boxes are built like all their other mill equipment—up to the standard which justified them in adopting the slogan—

"The Best in Rolling Mill Machinery"

MACKINTOSH-HEMPHILL COMPANY

PITTSBURGH, PENNA.

FORT PITT FOUNDRY
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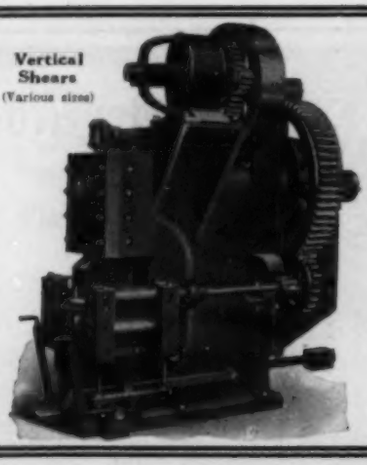
WOODARD MACHINE CO.
PITTSBURGH IRON & STEEL FOUNDRY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Rolling Mill Machinery
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Special Machinery
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*1

Gears?

We Plane Gears Bevel—108" Dia. 6" Pitch
Spur—150" Dia. 6" Pitch

Let us know your requirements

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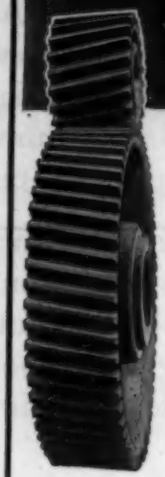

For greater safety, more power, less noise and minimum vibration.

Use Nuttall Helical Gears

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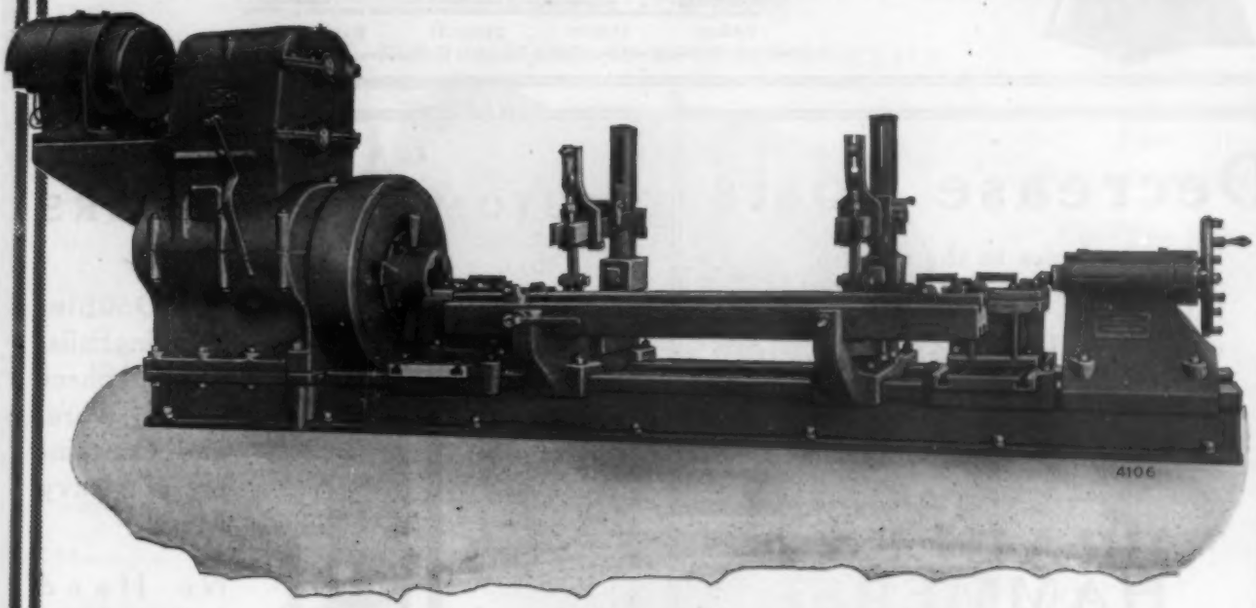
COMPLETE
ROLLING MILL EQUIPMENT



34" HEAVY DUTY ROLL LATHE, CHANGE GEAR TYPE

This is our latest and most improved design of HEAVY DUTY ROLL LATHE. A number of important improvements have recently been incorporated including a new and quieter running drive and change gears for the head stock. The gears are shifted by a lever as shown, which is within easy reach of the operator from the floor.

The demand in all lines of tools today is not for equipment which will merely do the work but for that which will do it in the least time, with the least power and maintenance, and will give the most uninterrupted satisfactory service.

We believe United Heavy Duty Roll Lathes meet these requirements.

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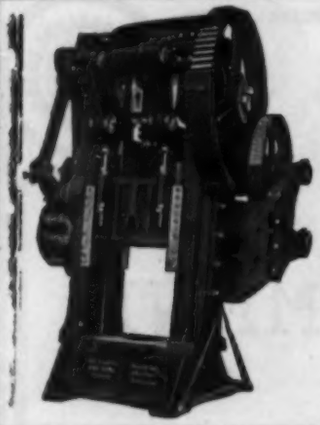
Largest Roll Makers in the World, Makers of the Largest Rolls



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The simplicity and strength of these machines and the many advantageous features assure the utmost in operating economy.

The wide range of sizes covers every requirement from the small tin cup to crown fenders, rear tonneaus and the most difficult forms.

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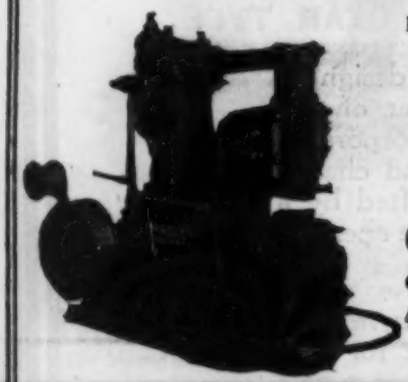
Bradley Hammers act instantly at a slight pressure on the treadle. They are speedy, powerful and economical.

BRADLEY HAMMERS



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For Rolls, Pinions, Gears, Guides, Dies, Coupling Boxes, and General Castings, subject to severe wear and SHOCK

"Adamite" Rolls and Castings have proven themselves to be the most economical in their long run.

The most conservative and the most progressive operators in the country's most modern mills have found that "Adamite" gives a greater value, measured by results shown on the cost sheet.

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One large user says, "We have been using several large Lewis Drives continuously for nearly 10 years and they have not cost us 10 cents in repairs".

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Specific details, estimates and plans for any of the above on request.

Some of the oustanding features of Lewis Herringbone Gear Drives are as follows:—

FRAME cast in one piece of special air furnace iron (our air furnace iron is 50% stronger than ordinary cupola iron).

BEARINGS extra heavy double ring oiling type equipped with split shells. Babbited and then bored in place to insure perfect alignment.

GEARS accurately designed and machined to eliminate unnecessary wear and insure noiseless contact. Mounted on forged steel shafts and thoroughly tested. This type of gear permits the use of increased ratios which means added economy in the use of high speed motors. The pinions are usually comparatively small in diameter and forged integral with the shaft. A ratio of 18 to 1 is not unusual in single reductions.

OIL-TIGHT CASINGS are provided on all drives for running gears in oil, and auxiliary oiling system are supplied when needed.

FLY WHEELS when required are machined all over and accurately balanced.

FLEXIBLE COUPLINGS of your selection for motor connections are mounted in place.

DOUBLE REDUCTION UNITS, outboard bearings, special bases and other special equipment can be furnished to suit any particular requirement.

Every unit is made specially to fit the requirements of each application. Can be designed for any particular ratio to transmit from 250 to 3000 H. P.

One of our engineers will be glad to discuss your drive problems with you.

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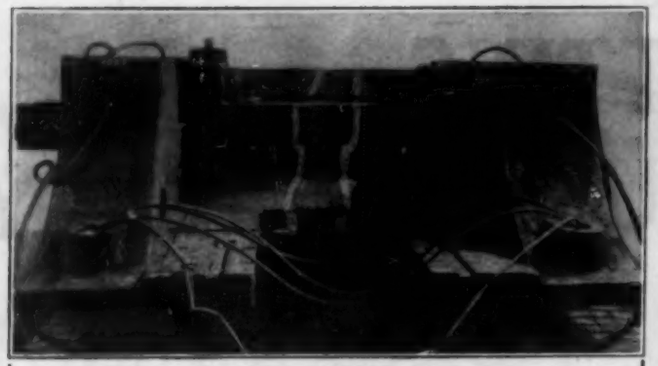

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Plastic-Arc

(Trade Mark)

WELDER

in 495 hours at a cost of $832.68.

A new base plate would have cost $4,500.00—and it would have taken the manufacturers at least three weeks to make shipment.

It will pay YOU to investigate the Wilson *Plastic-Arc* Welder and Wilson "Color-tipt" Welding Metals.

For Arc Welding

cast iron, malleable iron, brass, bronze, steel, and monel metal.

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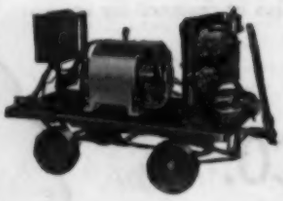

Wilson Welder & Metals Co., Inc.

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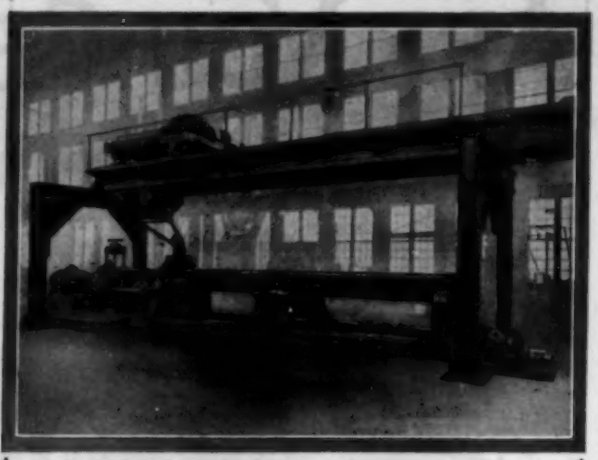
Agencies thruout the country



THIS Pipe Skelp Bending Machine

is designed and built for bending pipe skelp or plates from the flat to the circular or pipe form, ready for heating, preparatory to welding joint. Capacity, 10" to 24" pipe.

This machine receives the flat hot plate and rolls it into pipe shape.

We design and make special machinery for use in the manufacture of iron and steel products. Send us either an outline of your needs, or original designs for estimating.

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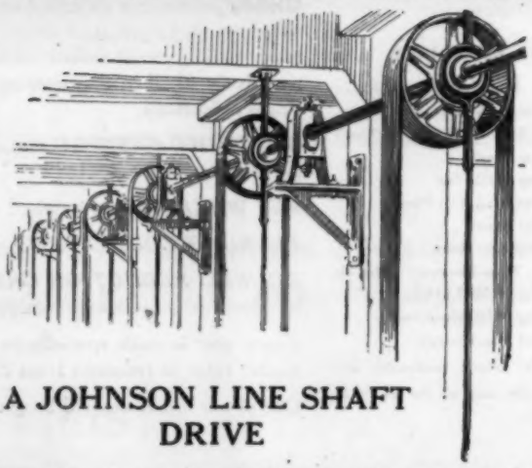

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Single Clutch with Pulley Mounted

Slow speed clutches are carried in stock for immediate shipment. Made in nine sizes from ¼ to 20 H. P. to fit shafting from ¾" to 3 3/16" diameter.

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(Rounds—Squares—Hexagons)

We are prepared to quote on
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and notice how easily the machine shears up to its maximum capacity and how *accurately*. It's got to have more than good outward appearance in order to do this—it's got to have real inbuilt quality and every Cleveland Gate Shear has.

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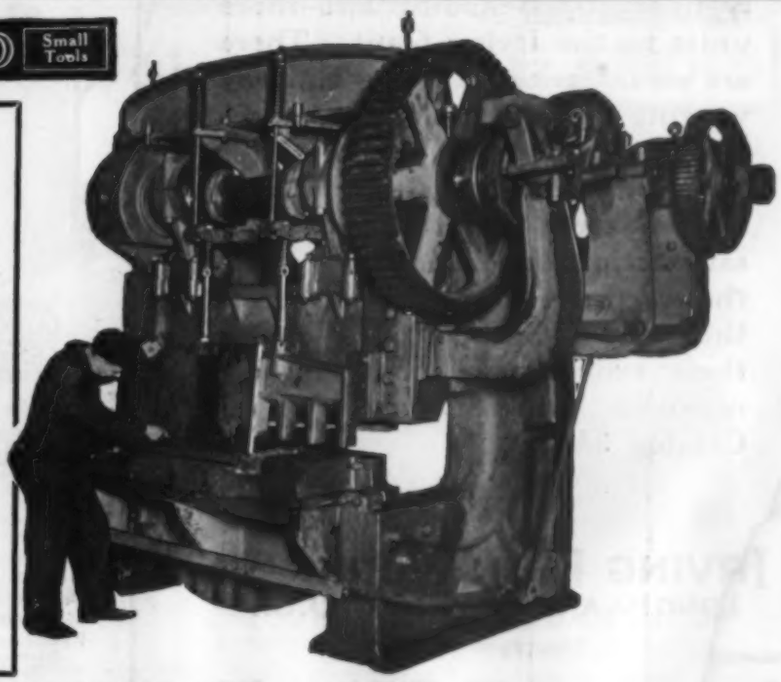

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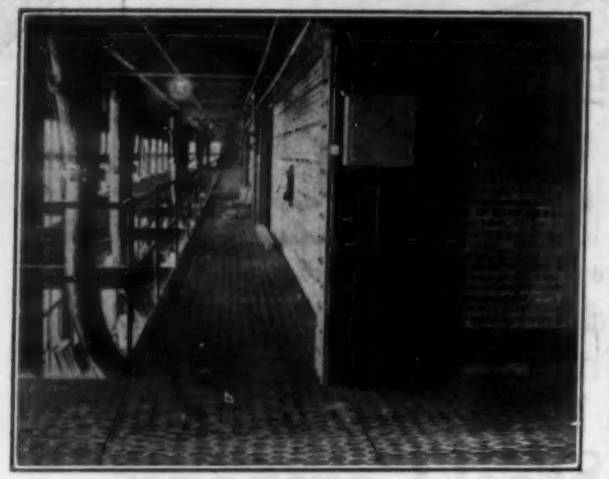

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LONG ISLAND CITY, N.Y., U.S.A.
Manufacturers of

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ABSOLUTELY NON-SLIPPING ALWAYS

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SMOOTH, hard, lasting, glossy finish. They fulfill the need of a rust preventative on your machinery. Are not affected by heat, grease, oil or water.

Thompson-Made Machinery Paint brightens; it gives a handsome, smooth appearance to all kinds of machinery. The protection it gives adds to the life of all machinery—a covering, a preservative and a practical economy in one. Sent for Color Chart.

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Protect the factory buildings with Protexcide; lengthen the life of the stack with Thermo-Stack; inside the factory, get the extra light that walls and ceilings coated with Daylight Mill White reflect. They are all Thompson-Made Paints.

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This embarrassing situation is largely obviated if you possess a Landis 12" x 120" Plain Self-Contained Grinding Machine.

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This Landis Grinding Machine is self-contained—the grinding wheel travels and reverses automatically, the work table remains stationary—the automatic feed can be set to reduce the diameter of the work from .00025" to .007 at each reversal of the wheel carriage.

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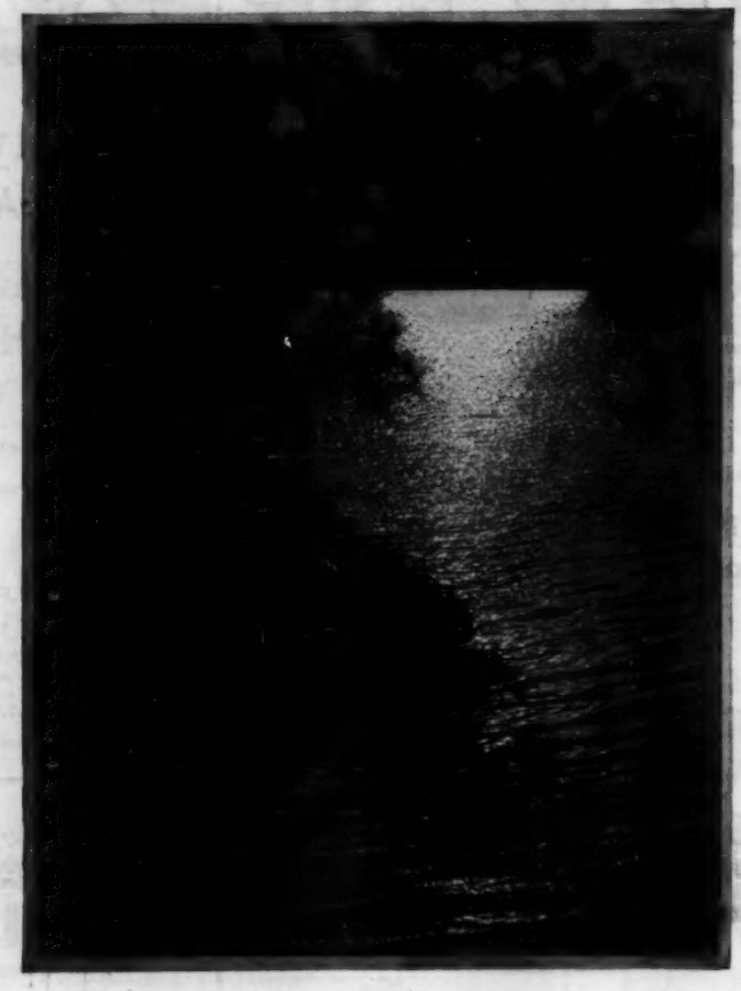

Vacation Without a Worry

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Compare this with prices paid for "hydraulic-compressed."

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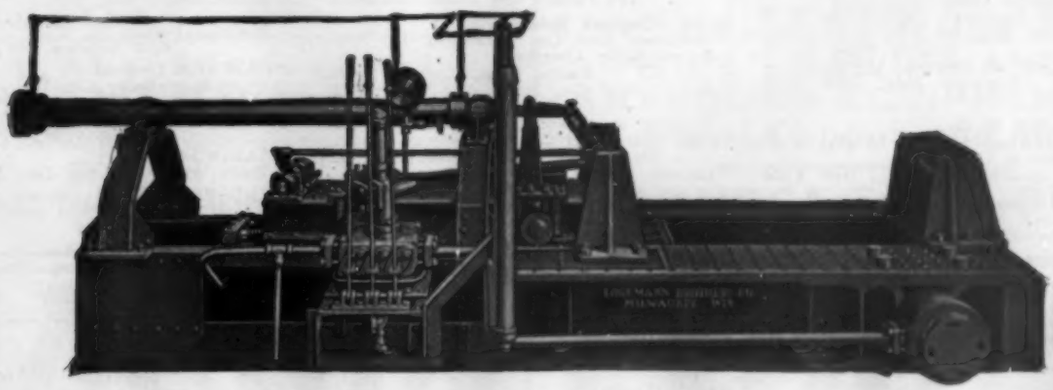

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Also Hydraulic Shaft Straighteners, Etc.

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Vanadium Corp. of America, Equitable Bldg., New York.

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BANDS (Steel)
Pollak Steel Co., The, Cincinnati, Ohio.

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Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Pacific Coast Steel Co., San Francisco, Cal.
Phillips, F. R., & Sons Co., Pennsylvania Bldg., Philadelphia, Pa.
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Illinois Steel Co., Chicago, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
McConway & Torley Co., Arsenal Station, Pittsburgh, Pa.
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BILLETS (Forging, Alloy Steel)
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Pacific Lumber Co., The, 332 S. Michigan Ave., Chicago, Ill.

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Bailey, Wm. M., Co., 506 Bakewell Bldg., Pittsburgh, Pa.
Connersville Blower Co., The, Connersville, Ind.
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.

BOILERS
Erie City Iron Works, East Ave. & R. R., Erie, Pa.
Wickes Boiler Co., The, Saginaw, Mich.

BOILERS AND SUPERHEATERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City
Erie City Iron Works, Erie, Pa.
Sotter Bros., Inc., Pottstown, Pa.

BOILERS (Waste Heat)
Babcock & Wilcox Co., The, 85 Liberty St., New York City
Wickes Boiler Co., The, Saginaw, Mich.

BOILERS (Water Tube)
Babcock & Wilcox Co., The, 85 Liberty St., New York City
Wickes Boiler Co., The, Saginaw, Mich.

BOILER TUBES
Babcock & Wilcox Tube Co., 85 Liberty St., New York City
Detroit Seamless Steel Tubes Co., Grand River Station, Detroit, Mich.
Johnson-Peter Co., Warehouse No. 34, Bush Terminal, Brooklyn, N. Y.
Keating, E. F., Co., 446-54 Water St., New York, N. Y.
Morris, Wheeler & Co., 30th & Locust streets, Philadelphia, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Williams & Co., Inc., 901-37 Penna. Ave., Pittsburgh, Pa.

BOLT AND NUT MACHINERY
Landis Machine Co., Waynesboro, Pa.
National Machinery Co., Tiffin, O.

BOLTS, DROP FORGINGS, RODS
American Car & Foundry Co., 165 Broadway, New York, N. Y.

BOLTS (Heat Treated)
Bethlehem Steel Co., Bethlehem, Pa.
Oliver Iron & Steel Corp., So. 10th & Muriel Sts., Pittsburgh, Pa.

BOLTS
Bethlehem Steel Co., Bethlehem, Pa.
Champion Rivet Co., E. 108th St. & Harvard Ave., Cleveland, O.
Clark Bros. Bolt Co., Milldale, Conn.
Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.
Lake Erie Bolt & Nut Co., 915 E. 63rd St., Cleveland, Ohio.
Oliver Iron & Steel Corp., Pittsburgh, Pa.
Rockford Bolt Co., 220 Mill St., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & So., Inc., Chicago, Ill.

BOLTS AND NUTS (Brass and Bronze)
Everitt Co., The, 271 Franklin St., Boston, Mass.

BOOKS (Technical)
Penton Publishing Co., Cleveland, O.

BORING, DRILLING AND MILLING MACHINES
Niles-Bement-Pond Co., 111 Broadway, New York City
Pawling & Harnischfeger Co., 38th & National Aves., Milwaukee, Wis.

BORING MILLS
Niles-Bement-Pond Co., 111 Broadway, New York City

BORING AND TURNING MACHINES
Niles-Bement-Pond Co., 111 Broadway, New York City

BRAKES (Electric)
Cutler-Hammer Mfg. Co., The, Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, Ohio.
General Electric Co., Schenectady, N. Y.

BRASS
Williams & Co., Inc., 901-37 Penna. Ave., Pittsburgh, Pa.

BRASS (Fabricators)
Bridgeport Brass Co., Bridgeport, Conn.
Chase Metal Works, Waterbury, Conn.
Hungerford, U. T., Brass & Copper Co., 80 Lafayette St., New York.
Hussey, C. G., & Co., Pittsburgh, Pa.
Michigan Copper & Brass Co., Detroit, Mich.
National Brass & Copper Co., The, Lisbon, Ohio.
New England Brass Co., Taunton, Mass.
Rome Brass & Copper Co., Rome, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
Taunton-New Bedford Copper Co., Taunton, Mass.

BRAZING OUTFITS
Air Reduction Sales Co., 342 Madison Ave., New York, N. Y.
Oxweld Acetylene Co., Newark, N. J.

BRICK (Silica, Magnesia, Chrome)
General Refractories Co., 117 So. 16th St., Philadelphia, Pa.
Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Pyro Clay Products Co., The, Oak Hill, O.
Soisson, Jos., Fire Brick Co., Connellsville, Pa.
Stowe-Fuller Co., Kirby Bldg., Cleveland, O.

BRICK (Silica, Magnesia, Chrome, Superrefractories)
Laclede Christy Clay Products Co., St. Louis, Mo.

BRICK INSULATING—See INSULATING BRICK

BRICKMAKING MACHINERY
Bonnot Co., The, Canton, O.

BRIDGE CRANES (Ore and Coal Handling)
McMyler Interstate Co., The, Bedford, O.

BRIDGES, BUILDINGS, VIADUCTS, STACKS (Steel)
American Bridge Co., 71 Broadway, New York, N. Y.
Belmont Iron Works, 22nd and Washington Ave., Philadelphia.
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Eichleay, John Jr., Co., So. 20th and Wharton, Pittsburgh, Pa.
McClintic-Marshall Co., Oliver Bldg., Pittsburgh, Pa.
Mt. Vernon Bridge Co., Mt. Vernon, O.
Phoenix Bridge Co., 20 S. 15th St., Philadelphia, Pa.
Steel Plate Products Co., Pottstown, Pa.

BRONZE (Manganese)
American Manganese Bronze Co., Holmesburg Junction, Philadelphia, Pa.
Bethlehem Steel Co., Bethlehem, Pa.

BRONZES
F. & H. Foundry Co., Inc., Tiffany Blvd., Newark, N. J.

BUCKETS (Clam Shell)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Brosius, Edgar E., 1212 Benedum Trees Bldg., Pittsburgh, Pa.
Browning Co., The, E. 162nd St. & Waterloo Rd., Cleveland, O.
Hayward Co., The, 50-54 Church St., New York City
Industrial Works, Bay City, Mich.
Williams, G. H., Co., Harbarger Lane & N. P. Ry., Erie, Pa.

BUCKETS (Clam Shell, Orange Peel, Drag Line, Grab)
McMyler-Interstate Co., Bedford, O.

BUCKETS (Drag Line)
Hayward Co., The, 50-54 Church St., New York City

BUCKETS (Dumping)
Atlas Car & Mfg. Co., Dept. E., Cleveland, Ohio.

BUCKETS (Elevator)
Hendrick Mfg. Co., Carbondale, Pa.

BUCKETS (Grab)
Brosius, Edgar E., Pittsburgh, Pa.
Brown Hoisting Machinery Co., 4403 St. Clair Ave., Cleveland, O.
Browning Co., E. 162nd St. & Waterloo Rd., Cleveland, O.
Byers Machine Co., 235 Sycamore St., Ravenna, Ohio.
Hayward Co., The, 50-54 Church St., New York City
Link-Belt Co., Chicago, Ill.
Orton & Steinbrenner Co., 608 S. Dearborn St., Chicago, Ill.
Wellman-Seaver-Morgan Co., 7000 Central Ave., Cleveland, O.
Williams, G. H., Co., Erie, Pa.

BUILDINGS (Sectional Steel)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.

BUILDINGS (Steel) — See BRIDGES, BUILDINGS AND VIADUCTS

BULLDOZERS
Long & Allstatter Co., Hamilton, Ohio.

BURNERS (Acetylene)—See TORCHES AND BURNERS (Acetylene, Blow, Oxy-acetylene)

BURNERS (Fuel Oil, Gas, and Combination)
Davison, N. C., Gas Burner & Welding Co., 2939 Smallman Ave., Pittsburgh, Pa.
Tate, Jones & Co., Inc., 914 Empire Bldg., Pittsburgh, Pa.

BUSHINGS (Brass and Bronze)
Everitt Co., The, 271 Franklin St., Boston, Mass.

BUSINESS CARDS (Engraved)
Wiggins, John B., Co., 705 Peoples Gas Bldg., Chicago, Ill.

BY-PRODUCT PLANTS
Koppers Co., The, Union Arcade, Pittsburgh, Pa.

CALCIUM CARBIDE
Air Reduction Sales Co., 342 Madison Ave., New York, N. Y.

CALITE
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.

CALORIZING
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.

CAN MAKING MACHINERY
Ams, Max, Machine Co., 101 Park Ave., New York City
Bliss, E. W., Co., 8 Adams St., Brooklyn, N. Y.

CAR DUMPERS
Wellman-Seaver-Morgan Co., 7000 Central Ave., Cleveland, O.

CAR DUMPERS (Coal, Ore and Ash Handling Machinery)
The McMyler-Interstate Co., Bedford, Ohio.

CARS (Industrial and Mining)
Atlas Car & Mfg. Co., Dept. E., Cleveland, Ohio.

CARS (Ingot and Open Hearth Charging)
Birdsboro Steel Fdy. & Machine Co., Birdsboro, Pa.

CASTINGS
National Roll & Foundry Co., The, Avonmore, Pa.

CASTINGS (Acid Metal)
Alliance Brass & Bronze Co., Alliance, Ohio.

CASTINGS (Alloy Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.
Union Steel Castings Co., 62nd and Butler Sts., Pittsburgh, Pa.

CASTINGS (Bessemer Iron)
Pennsylvania Engineering Works, New Castle, Pa.
Valley Mould & Iron Corp., Sharpsville, Pa.

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American Manganese Bronze Co., Holmesburg Junction, Philadelphia, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
F. & H. Foundry Co., Inc., Tiffany Blvd., Newark, N. J.
Federal Signal Co., Albany, N. Y.
Keystone Bronze Co., 39th St., Pittsburgh, Pa.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.
Mesta Machine Co., Homestead, Pa.
Shoop Bronze Co., The, 344 West Sixth St., Tarentum, Pa.
Turner & Seymour Mfg. Co., Torrington, Conn.

CASTINGS (Bronze Acid Resisting)
Wellman Bronze Co., The, 6017 Superior Ave., Cleveland, O.

CASTINGS (Copper)
Keystone Bronze Co., 39th St., Pittsburgh, Pa.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.
New Process Copper Casting Co., 5323-25 Butler St., Pittsburgh, Pa.

CASTINGS (Electric Steel)
Acme Steel & Malleable Iron Works, Buffalo, N. Y.
Blackwood Electric Steel Corp., Parkersburg, W. Va.
Crucible Steel Casting Co., The, Champlain and Canal Rds., Cleveland, Ohio.
Eastern Steel Castings Co., Newark, N. J.
Farrell-Cheek Steel Foundry Co., Sandusky, Ohio.
Maynard Electric Steel Castings Co., 2-12 Kilbourn Rd., Milwaukee, Wis.
Milwaukee Steel Foundry Co., 101-121 S. Water St., Milwaukee, Wis.
Pelton Steel Co., Milwaukee, Wis.
Racine Steel Castings Co., Racine, Wis.

CASTINGS (Gray Iron)
American Foundry & Construction Co., 4700 2nd Ave., Pittsburgh, Pa.
Bethlehem Steel Co., The, Bethlehem, Pa.
Birdsboro Steel Fdy. & Machy. Co., Birdsboro, Pa.
Buffalo Foundry & Machine Co., 1543 Fillmore Ave., Buffalo, N. Y.
Caroline Foundry Co., 723 S. Caroline St., Baltimore, Md.
Cascade Foundry Co., Erie, Pa.
Chambersburg Engineering Co., Chambersburg, Pa.
Cyclops Foundry Co., Pittsburgh, Pa.
DuBois Iron Works, 800 North Brady St., DuBois, Pa.
Federal Signal Co., Albany, N. Y.
Lake Shore Engine Works, Marquette, Mich.
Link-Belt Co., Chicago, Ill.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Mesta Machine Co., Homestead, Pa.
North Buffalo Hardware Foundry Co., Buffalo, N. Y.
Pennsylvania Engineering Works, New Castle, Pa.
St. Louis Malleable Casting Co., St. Louis, Mo.
Smith Gas Engineering Co., Dayton, Ohio.
Standard Engrg. Co., Ellwood City, Pa.
Standard Foundry Co., Buffalo, N. Y.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Turner & Seymour Mfg. Co., Torrington, Conn.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

CASTINGS (Heat and Acid Resisting)
Cutler Steel Co., Bowman Bldg., Pittsburgh, Pa.

CASTINGS (Malleable)
Acme Steel & Malleable Iron Works, Inc., Buffalo, N. Y.
American Malleable Castings Association, 1900 Euclid Ave., Cleveland, O.
Arcade Malleable Iron Co., Muskegon Ave., Worcester, Mass.
Belle City Malleable Iron Co., Racine, Wis.
Columbus Malleable Iron Co., Columbus, O.
Danville Malleable Iron Co., Danville, Ill.
Dayton Malleable Iron Co., Dayton, O.
Decatur Malleable Iron Co., Decatur, Ill.
Frazer & Jones, Syracuse, N. Y.
Illinois Malleable Iron Co., Chicago, Ill.
Iowa Malleable Iron Co., Fairfield, Iowa.
Kalamazoo Malleable Iron Co., Kalamazoo, Mich.
Lakeside Malleable Castings Co., Racine, Wis.
Link-Belt Co., P. O. Box 346, Indianapolis, Ind.
Marion Malleable Iron Wks., Marion, Ind.
Moline Malleable Iron Co., St. Charles, Ill.
Newark Malleable Iron Works, Newark, N. J.
Northern Malleable Iron Co., St. Paul, Minn.
Northwestern Malleable Iron Co., Milwaukee, Wis.
Peoria Malleable Castings Co., Peoria, Ill.
Pittsburgh Malleable Iron Co., Pittsburgh, Pa.
Rockford Malleable Iron Works, Rockford, Ill.
Ross-Meehan Foundries, Chattanooga, Tenn.
St. Louis Malleable Castings Co., St. Louis, Mo.
Symington, T. H., Co., The, Lincoln Park Works, Rochester, N. Y.
Temple Malleable Iron & Steel Co., Harrison Bldg., Philadelphia, Pa.
Vermillion Malleable Iron Co., Hoopeston, Ill.
Wanner Malleable Castings Co., Hammond, Ind.
Warren Tool & Forge Co., 225 Griswold St., Warren, Ohio
Wisconsin Malleable Iron Co., Milwaukee, Wis.
Zanesville Malleable Co., Zanesville, O.

CASTINGS (Manganese Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

CASTINGS (Monel Metal)
Pittsburgh Valve, Foundry & Construction Co., 26th St. & A. V. R. R., Pittsburgh, Pa.

CASTINGS (Semisteel)
Buffalo Foundry & Machine Co., 1543 Fillmore Ave., Buffalo, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Pennsylvania Engineering Works, New Castle, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

CASTINGS (Steel)
Allegheny Steel Co., Brackenridge, Pa.
American Adamite Co., The, 314 Oliver Bldg., Pittsburgh, Pa.
Atlas Steel Casting Co., Buffalo, N. Y.
Belle City Malleable Iron Co., Racine, Wis.
Bethlehem Steel Co., The, Bethlehem, Pa.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Blackwood Electric Steel Corp., Parkersburg, W. Va.
Chicago Steel Foundry Co., 37th and Kedzie Ave., Chicago, Ill.
Commercial Steel Castings Co., The, Marion, Ohio.
Crucible Steel Casting Co., Cleveland, O.
Duquesne Steel Foundry Co., Pittsburgh, Pa.
Eastern Steel Castings Co., Newark, N. J.
Falk Corporation, The, Milwaukee, Wis.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Federal Steel Foundry Co., Chester, Pa.
Hubbard Steel Fdry. Co., East Chicago, Ind.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Maynard Electric Steel Castings Co., 2-12 Kilbourn Rd., Milwaukee, Wis.
Mesta Machine Co., Homestead, Pa.
Milwaukee Steel Foundry Co., 101-121 South Water St., Milwaukee, Wis.
Ohio Steel Foundry Co., The, Springfield, O.
Otis Steel Co., Cleveland, O.
Pelton Steel Co., Chicago Ave. & Elliott Place, Milwaukee, Wis.
Racine Steel Castings Co., Racine, Wis.
Reading Steel Casting Co., Reading, Pa.
Reliance Steel Casting Co., 28th & Smallman Sts., Pittsburgh, Pa.
Ross-Meehan Foundries, Chattanooga, Tenn.
Sharon Foundry Co., Sharon, Pa.
Smith, George H., Steel Casting Co., Milwaukee, Wis.
Sivyer Steel Casting Co., Milwaukee, Wis.
Union Steel Casting Co., 62nd and Butler Sts., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
West Steel Castings Co., Cleveland, O.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

CAST IRON PIPE
United States Cast Iron Pipe & Fdry. Co., Burlington, N. J.

CASTORS (Plate Mill)—See PLATE CASTORS

CEMENT MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bonnot Co., The, Canton, O.

CEMENT (High Temperature)
Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York, N. Y.
Savage Mountain Fire Brick Co., Frostburg, Md.

CEMENT KILNS (Rotary Liners and Brick)
Laclede Christy Clay Products Co., St. Louis, Mo.

CENTER PLATES (Railroad)
Transue & Williams Steel Forging Corp., Alliance, O.

CENTRAL STATION EQUIPMENT
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

CHAIN DRIVES
Arcade Malleable Iron Co., Muskegon Avenue, Worcester, Mass.
Link-Belt Co., Chicago, Ill.

CHANNELS—See STEEL (Structural)

CHAPLETS
Champion Mch. & Forging Co., Cleveland, Ohio.
Erdle Perforating Co., Rochester, N. Y.

CHARCOAL
Hillman Coal & Coke Co., First National Bank Bldg., Pittsburgh, Pa

CHECKS (Time, Tool and Pay)
Matthews & Co., James H., 3942 Forbes St., Pittsburgh, Pa.
Pannier Bros. Stamp Co., 210 Sandusky St., Pittsburgh, Pa.

CHEMICALS
Ford, J. B., Co., The, Wyandotte, Mich.

CHISEL BLANKS
Hunter Saw & Machine Co., 57th and Butler Sts., Pittsburgh, Pa.

CHROME ORE (Special Furnace)
Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.

CHROME VANADIUM STEEL (Cold Drawn)
Union Drawn Steel Co., Beaver Falls, Pa.

CHROMIUM METAL
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y

CHUCKS
Chicago Pneumatic Tool Co., 6 East 44th St., New York City

CHUCKS (Lathe)
Whiton, D. E., Mach. Co., New London, Conn.

CLAY MACHINERY
Bonnot Co., The, Canton, O.

CLEANER (Metal)
Ford, J. B., Co., The, Wyandotte, Mich.

CLEANING SPECIALTIES
Ford, J. B., Co., The, Wyandotte, Mich.

CLUTCHES
Eastern Machinery Co., The, Gregory St., New Haven, Conn.
Johnson, Carlyle, Machine Co., The, Manchester, Conn.

CLUTCHES (Cut-Off Coupling)
Johnson, Carlyle, Machine Co., The, Manchester, Conn.

CLUTCHES (Friction)
Eastern Machinery Co., The, Gregory St., New Haven, Conn
Johnson, Carlyle, Machine Co., The, Manchester, Conn.
Jones, W. A., Foundry & Machine Co., 4437 Roosevelt St., Chicago, Ill.

COAL AND COKE
Addy, Matthew Co., The, Cincinnati, O.
Cleveland-Cliffs Iron Co., Kirby Bldg., Cleveland, O.
Crocker Bros., 21 E. 40th St., New York City
Eaton, Rhodes & Co., Cincinnati, O.
Hanna, The M. A. Co., Cleveland, O.
Hickman, William & Co., 1343 Oliver Bldg., Pittsburgh, Pa.
Hillman Coal & Coke Co., First National Bank Bldg., Pittsburgh, Pa.
Iron Trade Products Co., 903 Farmers Bank Bldg., Pittsburgh, Pa.
Irwin Fuel Co., First National Bank Bldg., Latrobe, Pa.
Pickands, Mather & Co., Western Reserve Bldg., Cleveland, Ohio.
Pilling & Co., Real Estate Trust Bldg., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.
Runyon, W. C., & Co., 350 Madison Ave., New York, N. Y.
Snyder, W. P., Co., Pittsburgh, Pa.
Straub, A. A., Coal & Coke Co., 1506 Keenan Bldg., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

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Orton & Steinbrenner Co., 608 S. Dearborn St., Chicago, Ill.

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Brown Hoisting Machinery Co., 4403 St. Clair Ave., Cleveland, O.
Link-Belt Co., Chicago, Ill.
Orton & Steinbrenner Co., 608 S. Dearborn St., Chicago, Ill.
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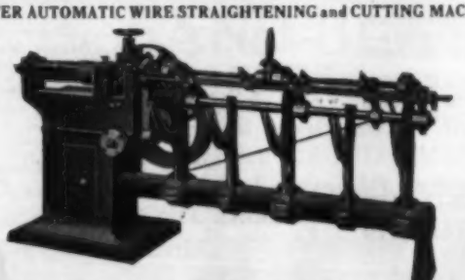

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COKE (See COAL AND COKE)

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., Cleveland, O.

COKE OVENS (By-Product)
Koppers Co., The, Pittsburgh, Pa.

COMPRESSORS (Air)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Chicago Pneumatic Tool Co., 6 East 44th St., New York
General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.

COMPRESSORS (Gas)
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.

CONCRETE INSERTS
Dayton Malleable Iron Co., Dayton, Ohio.

CONCRETE MIXERS—See MIXERS (Concrete)

CONDENSERS
Champion Engineering Co., The, Mt. Vernon, O.
Ingersoll-Rand Co., 11 Brodaway, New York, N. Y.

CONDUITS (Electric)
Youngstown Sheet & Tube Co., Youngstown, Ohio.

CONNECTING RODS
Leard, Wm., Co., The, New Brighton, Pa.
Standard Gauge Steel Co., Beaver Falls, Pa.
Transue & Williams Steel Forging Corp., Alliance, Ohio.

CONTRACTORS—See ENGINEERS AND CONTRACTORS

CONTROLLERS (Electric)
Cutler-Hammer Mfg. Co., The, Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, Ohio.

CONVEYORS (Elevating and Conveying)
Bartlett & Snow Co., C. O., Cleveland, O.
Brown Hoisting Machinery Co., 4403 St. Clair Ave., Cleveland, O.
Link-Belt Co., Chicago, Ill.

COOLING BEDS
Morgan Construction Co., Worcester, Mass.

COPPER AND BRASS ROLLING MILL EQUIPMENT
Mackintosh-Hemphill Co., 12th & Etna Sts., Pittsburgh, Pa.

COPPER AND BRASS (Drawing Machinery)
Vaughn Machinery Co., The, Cuyahoga Falls, O.

COPPER (Fabricators)
Bridgeport Brass Co., Bridgeport, Conn.
Chase Metal Works, Waterbury, Conn.
Hungerford, U. T., Brass & Copper Co., 80 Lafayette St., New York, N. Y.
Hussey, C. G., & Co., Pittsburgh, Pa.
Michigan Copper & Brass Co., Detroit, Mich.
National Brass & Copper Co., The, Lisbon, Ohio.
New England Brass Co., Taunton, Mass.
Rome Brass & Copper Co., Rome, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
Taunton-New Bedford Copper Co., Taunton, Mass.

COPPER SHEETS
Copper & Brass Research Association, 25 Broadway, New York, N. Y.

COPPER SHEETS FOR DRAWING. DRAWN TUBING AND WIRE
Copper & Brass Research Association, 25 Broadway, New York, N. Y.

CORE MAKING MACHINES
American Foundry Equipment Co., Madison Ave. and 46th St., New York City

CORE OIL
Thompson & Co., 857 North Ave., Pittsburgh, Pa.

CORE OVENS
Ryan & Company, F. J., Wesley Bldg., Philadelphia, Pa.

COUPLINGS (Carriage)
Bradley, C. C., & Son, Inc., 432 N. Franklin St., Syracuse, N. Y.

CRANES (Charging)
Alliance Machine Co., Alliance, O.
Cleveland Crane & Engrg. Co., The, Wickliffe, O.

CRANES (Crawling, Tractor, Etc.)
Brown Hoisting Machinery Co., 4403 St. Clair Ave., Cleveland, Ohio.
Industrial Works, Bay City, Mich.
McMyler-Interstate Co., Bedford, Ohio.
Orton & Steinbrenner Co., 608 S. Dearborn St., Chicago, Ill.

CRANES (Electric Traveling)
Alliance Machine Co., Alliance, O.
Cleveland Crane & Engrg. Co., The, Wickliffe, O.
Erie Steel Construction Co., The, Erie, Pa.
Euclid Crane & Hoist Co., Dept. B., Euclid, Ohio.
Milwaukee Elec. Crane & Mfg. Co., Milwaukee, Wis.
Niles-Bement-Pond Co., 111 Broadway, New York City
Northern Engineering Works, 214 Chene St., Detroit, Mich.
Pawling & Harnischfeger Co., Milwaukee, Wis.
Shepard Electric Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y.
Stamp Electric Hoist Co., 968 East 69th Place, Cleveland, O.
Whiting Corporation, Harvey, Ill.

CRANES (Erection)
Industrial Works, Bay City, Mich.

CRANES (Hand)
Armington Eng. Co., The, Euclid, Ohio.
Cleveland Crane & Engrg. Co., The, Wickliffe, O.
Niles-Bement-Pond Co., 111 Broadway, New York City

CRANES (Hydraulic)
Alliance Machine Co., Alliance, O.
Cleveland Crane & Engrg. Co., The, Wickliffe, O.

CRANES (Jib)
Chambersburg Engineering Co., Chambersburg, Pa.
Niles-Bement-Pond Co., 111 Broadway, New York City.

CRANES (Locomotive)
Brown Hoisting Machinery Co., 4403 St. Clair Ave., Cleveland, O.
Browning Co., The, E. 162nd St. & Waterloo Rd., Cleveland, O.
Industrial Works, Bay City, Mich.
Link-Belt Co., Chicago, Ill.
McMyler Interstate Co., Bedford, O.
Orton & Steinbrenner Co., 608 S. Dearborn St., Chicago, Ill.

CRANES (Pillar)
Chambersburg Engineering Co., Chambersburg, Pa.
Niles-Bement-Pond Co., 111 Broadway, New York City
Byers, John F., Machine Co., The, 235 Sycamore St., Ravenna, O.
Pawling & Harnischfeger Co., 38th & National Aves., Milwaukee, Wis.

CRANES (Portable)
Canton Foundry & Machine Co., The, Canton, Ohio.

CRANES (Steam and Pnuematic, Wire Mills)
Cleveland Crane & Engrg. Co., The, Wickliffe, O.

CRANES (Wall)
Milwaukee Electric Crane & Mfg. Co., Milwaukee, Wis.
Niles-Bennet-Pond Co., 111 Broadway, New York City

CRANK SHAFTS
Bethlehem Steel Co., Bethlehem, Pa.
Ladish Drop Forge Co., Cudahy, Wis.
Leard, Wm., Co., The, New Brighton, Pa.
Moltrup Steel Products Co., The Beaver Falls, Pa.
Pollak Steel Co., The, Cincinnati, O.
Standard Gauge Steel Co., Beaver Falls, Pa.
Transue & Williams Steel Forging Corp., Alliance, Ohio.

CRUSHING, GRINDING AND PULVERIZING MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bonnot Co., The, Canton, O.

CUPRO-VANADIUM
Vanadium Corp. of America, Equitable Bldg., New York, N. Y.

CUTTERS (Keyway)
Morton Mfg. Co., Muskegon Heights, Mich.

CUTTING AND WELDING APPARATUS—See WELDING AND CUTTING APPARATUS (Electric)

CUTTING AND WELDING (Oxy-Acetylene Process)—See WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene Process)

CYANIDE POTS
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.

CYLINDERS (Acetylene)—See ACETYLENE IN CYLINDERS

CYLINDERS (Oxygen)—See OXYGEN IN CYLINDERS

CYLINDERS (Pressure)
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.

DEOXIDIZERS
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

DESULPHURIZER
Sulfex Corp., 264 Jelliff Ave., Newark, N. J.

DIE BLOCKS
Bethlehem Steel Co., Bethlehem, Pa.
Heppenstall Forge & Knife Co., Pittsburgh, Pa.

DIE BLOCKS (Pressed and Hammered)
Bethlehem Steel Co., Bethlehem, Pa.

DIES
Bethlehem Steel Co., Bethlehem, Pa.
Federal Signal Co., Albany, N. Y.
Richards, I. P., Co., Providence, R. I.
Toledo Machine & Tool Co., Toledo, O.
Vanadium Corp. of America, Equitable Bldg., New York, N. Y.

DIES AND PUNCHES
Richards, I. P., Co., Providence, R. I.

DIES (Lettering and Embossing)
Pannier Bros. Stamp Co., 210 Sandusky St., Pittsburgh, Pa.

DOORS AND SHUTTERS (Steel, Fire and Rolling)
Kinnear Manufacturing Co., 818-868 Field Ave., Columbus, O.

DOUBLE SEAMERS
Ams, Max, Machine Co., The, 101 Park Ave., New York, N. Y.

DRAW BENCHES
Standard Engineering Co., Ellwood City, Pa.
Vaughn Machinery Co., The, Cuyahoga Falls, O.
Vaughn Machinery Co., The, Cuyahoga Falls, O.

DRAWING TABLES
Hein Furniture Co., 126-136 S. Huron St., Toledo, O.

DRILLING MACHINERY
Niles-Bement-Pond Co., 111 Broadway, New York, N. Y.

DRILLS
Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y.

DRILLS (Electric)
Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y.

DRILLS (Pneumatic)
Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y.
Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, O.
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.

DRILLS (Rock)
Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.

DRIVES (Cut Herringbone Gears)
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.

DRYERS (Sand, Coal, Ores, Chemical, Etc.)
Bartlett & Snow, C. O., Co., Cleveland, O.
Bonnot Co., The, Canton, O.
Duff Patents Co., Inc., Pittsburgh, Pa.

DUST ARRESTING SYSTEMS
Pangborn Corporation, P. O. Box 858, Hagerstown, Md.

ELECTRICAL EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.
General Electric Co., Schenectady, N. Y.

ELECTRIC HEATERS (for Rivets, Bolts, Drop Forgings, Rods)
American Car & Foundry Co., 165 Broadway, New York, N. Y.

ELECTRIC TOOLS (Portable)—See TOOLS (Portable Electric)

ELEVATOR GUIDES
Standard Gauge Steel Co., Beaver Falls, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.

ELEVATORS (Bucket)
Bartlett & Snow, C. O., Co., Cleveland, O.
Link-Belt Co., Chicago, Ill.

EMERY WHEEL DRESSERS
Calder, Geo. H., Co., 626 N. Prince St., Lancaster, Pa.

ENGINE LATHES—See LATHES (Engine)

ENGINEERS AND CONTRACTORS
Ferguson, H. K., Co., The, 6523 Euclid Ave., Cleveland, O.
Freyn, Brassert & Co., Peoples Gas Bldg., Chicago, Ill.
Hagan, George J., Co., Chamber of Commerce Bldg., Pittsburgh, Pa.
Kennedy, Julian, Bessemer Bldg., Pittsburgh, Pa.
Laughlin, Alex, & Co., First National Bank Bldg., Pittsburgh, Pa.
Mackintosh-Hemphill Co., 12th & Etna Sts., Pittsburgh, Pa.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

MOLDING OVER 98% SILICA SANDBLASTING
PORTAGE SANDS
THE PORTAGE SILICA CO.
YOUNGSTOWN, OHIO

HOEVEL SANDBLAST MACHINES
Dustless Sand Blast Rooms, Rotary Table, Revolving Barrel Sandblast Machines, Hose Sandblasts, Nozzles and Repairs always in stock.
HOEVEL MANUFACTURING CORPORATION
152 OGDEN AVE., JERSEY CITY, N. J.
Controlled by L. O. Koven & Bro.
Cleveland Offices: 501 Ulmer Bldg.

OHIO GREASES
"Better Lubricants for Every Requirement"
OHIO GREASE CO.
LOUDONVILLE OHIO

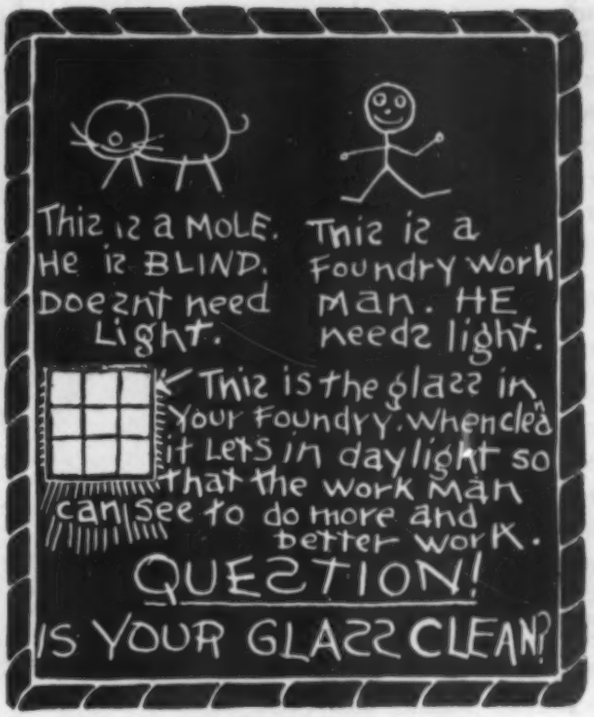
HERMAN
Jarr Independent Rollover and Pattern Drawing
MOLDING MACHINES
Send us your Inquiry and our Service Department will gladly advise with you on your requirements.
Herman Pneumatic Machine Co. General Offices: Union Bank Bldg., Pittsburgh, Pa.

FLINT SHOT
For Sand Blasting
UNITED STATES SILICA CO.
122 South Michigan Ave. Chicago

WOOD AND METAL PATTERNS
also MATCH PLATE WORK
Send us your blue-prints
SENECA PATTERN WORKS
SENECA FALLS, N. Y.

SERVICE
SAND-BLASTS
DUST ARRESTERS
TYPE AND SIZE FOR EVERY REQUIREMENT
P. O. Box 858 World's Largest Manufacturers

CLEVELAND
TRAMRAILS HAND OR ELECTRIC CRANES 250 LBS. 500 TONS
The Cleveland Crane & Engineering Co.
Wickliffe, Ohio *2


This is a MOLE. He is BLIND. Doesn't need Light.
This is a Foundry work man. He needs light.
This is the glass in your Foundry. When cleaned it lets in daylight so that the work man can see to do more and better work.
QUESTION!
IS YOUR GLASS CLEAN?

IF you have ever taken an active part in athletics you know that the great thing back of a winning team is "Spirit."

The same thing is true in the efficient management of men. Instill a spirit of loyalty and a desire to be worthy of your trust and instantly "turnover" becomes nil. Production increases. Spoilage decreases. Accidents become fewer.

Nothing helps to create this "spirit" like bright, well lighted surroundings. Cleaning that dirty glass will prove one of the best investments you ever made. And you can clean it quickly—easily—economically—with—

Skybryte CLEANER (LIQUID)

No skilled labor is necessary to clean the worst rust and carbon scale encrusted glass with Skybryte. Five gallons cleans 4000 sq. ft. The average cost of cleaning including both labor and material is less than ¾c per sq. ft.

Write at once for list of national users and details of our free trial offer.

SKYCO NO-GLARE
Eliminates Glare and Reduces Heat

The SKYBRYTE Co.
Bangor Bldg., Cleveland
Chicago Branch
20 E. Jackson Blvd.

Proper Illumination for Daylight

ENGINEERS AND CONTRACTORS (Continued)
McClure, Geo. W., Sons & Co., Pittsburgh, Pa.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.
Moore, W. E., & Co., Union Bank Bldg., Pittsburgh, Pa.
Phoenix Iron Co., 20 South 15th St., Philadelphia, Pa.
Pittsburgh Valve, Fdry. & Construction Co., 26th St. & A. V. Ry., Pittsburgh, Pa.
Robinson, Dwight P., Co., 125 E. 46th Street, New York, N. Y.
Smythe, S. R., Co., The, Pittsburgh, Pa.
Sutton-Abramsen Engrg. Co., Pittsburgh, Pa.
Swindell, Wm. & Bros., Pittsburgh, Pa.

ENGINEERS (Consulting)
Ellis, Frank I., 2127 Farmers Bank Bldg., Pittsburgh, Pa.
Freyn, Brassert & Co., Peoples Gas Bldg., Chicago, Ill.
Kennedy, Julian, Pittsburgh, Pa.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.
Moore, W. E., & Co., Union Bank Bldg., Pittsburgh, Pa.
Perin, C. P., Marshall, S. M., 1107 Broadway, New York, N. Y.
Robinson, Dwight P., Co., 125 E. 46th Street, New York, N. Y.
Shover, Barton R., 424 Oliver Bldg., Pittsburgh, Pa.

ENGINEER, CONSULTING (By-Product Coke Oven and Gas Plants)
Koppers Co., The, Pittsburgh, Pa.

ENGINEERS (Industrial)
American Industrial Furnace Corp., 185 Devonshire St., Boston, Mass.
Bedaux, Chas. E., Co., The, 4500 Euclid Ave., Cleveland, O.

ENGINEERS (Industrial Plant Construction)
Chase, Frank D., Inc., 645 N. Michigan Ave., Chicago, Ill.

ENGINES (Diesel)
Falk Corporation, The, Milwaukee, Wis.

ENGINES (Gas)
Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y.

ENGINES (Gasoline)
Bailey, Wm. M., Co., 506 Bakewell Bldg., Pittsburgh, Pa.
Wellman-Seaver-Morgan Co., 7000 Central Ave., Cleveland, O.

ENGINES (Heavy Duty)
Mesta Machine Co., Homestead, Pa.

ENGINES (Oil)
Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.

ENGRAVERS (Steel and Copper Plate)
Wiggins, John B., Co., 705 Peoples Gas Bldg., Chicago, Ill.

EXHAUSTERS (Gas)—See GAS EXHAUSTERS

EXPANDED AND PERFORATED METAL
McCalla, Harold, Co., The, Pier 56, North Wharves, Delaware River, Philadelphia, Pa.

FACTORY BUILDING—See BRIDGES, BUILDINGS AND VIADUCTS

FANS (Heating and Ventilating)
Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.

FENCE (Chain Link)
Wickwire Spencer Steel Corp., 41 E. 42nd St., New York, N. Y.

FENCES—See WIRE FENCES

FERRO-ALLOYS
Cleveland-Cliffs Iron Co., Kirby Bldg., Cleveland, O.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.
Keokuk Electro-Metals Co., 136 So. La Salle St., Chicago, Ill.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Leavitt, C. W., & Co., 30 Church St., New York, N. Y.
Metal & Thermit Corp., 120 Broadway, New York, N. Y.
Park & Williams, Inc., Philadelphia, Pa.

FERRO-CARBON TITANIUM
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

FERRO-CHROME
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

FERRO-MANGANESE
Crocker Bros., 21 E. 40th St., New York City
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Leavitt, C. W., & Co., 30 Church St., New York, N. Y.
Rogers, Brown & Co., Cincinnati, O.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

FERRO-SILICON
Crocker Bros., 21 E. 40th St., New York City
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.
Globe Iron Co., Jackson, O.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Keokuk Electro-Metals Co., 136 So. La Salle St., Chicago, Ill.
Rogers, Brown & Co., Cincinnati, O.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

FERRO-VANADIUM
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Vanadium Corp. of America, Equitable Bldg., New York

FIRE BRICK AND CLAY
Ashland Fire Brick Co., Ashland, Ky.
Brighton Fire Brick Co., Block House Run, New Brighton, Pa.
Clearfield Brick Mfg. Co., Clearfield Trust Bldg., Clearfield, Pa.
Crescent Refractories Co., Curwensville, Clearfield Co., Pa.
Dover Fire Brick Co., Cuyahoga Bldg., Cleveland, Ohio.
Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.
Haws Refractories Co., Johnstown, Pa.
Ironton Fire Brick Co., The, Ironton, Ohio.
Kier Fire Brick Co., Pittsburgh, Pa.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Mutton Hollow Fire Brick Co., The, Woodbridge, N. J.
Northern Refractories Co., Elk County National Bank Bldg., Ridgway, Pa.
Portsmouth Refractories Co., Portsmouth, O.
Pyro Clay Products Co., The, Oak Hill, O.
Queen's Run Refractories Co., Inc., Lock Haven, Pa.
Star Clay Products Co., Oliver Bldg., Pittsburgh, Pa.
Stowe-Fuller Co., The, Kirby Bldg., Cleveland, Ohio.
Superior Basic Brick Co., 517 Bessemer Bldg., Pittsburgh, Pa.
Union Mining Co., Mt. Savage, Md.

FIRE CLAY (Notch)
Acme Fire Clay & Coal Co., Wabash Bldg., Pittsburgh, Pa.

FIRE CLAYS (Special Clays and Prepared Mixes)
Laclede-Christy Clay Products Co., St. Louis, Mo.

FIRE DOORS AND SHUTTERS
Kinnear Mfg. Co., The, Columbus, Ohio.

FLANGES (Pipe)
Dart, E. M., Mfg. Co., Providence, R. I.

FLASKS (Foundry)
American Foundry Equipment Co., Madison Ave. and 46th St., New York City

FLOORING (Fireproof, Metallic, Nonslipping, Ventilating)
Irving Iron Works Co., Long Island City, N. Y.

FLOORING (Redwood)
Pacific Lumber Co., The, 332 S. Michigan Ave., Chicago, Ill.

FLOORING (Wood Block Creosoted)
Republic Creosoting Co., Merchants Bank Bldg., Indianapolis, Ind.

FLUOR SPAR
Hickman, Williams & Co., 1343 Oliver Bldg., Pittsburgh, Pa.
Hillside Fluor Spar Mines, First National Bank Bldg., Chicago, Ill.
Iron Trade Products Co., 903 Farmers Bank Bldg., Pittsburgh, Pa.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.

FLUX (Iron, Brass, Steel)
Sulfex Corp., 264 Jelliff Ave., Newark, N. J.

FORGES
Bradley, C. C. & Sons, Inc., Syracuse, N. Y.
Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.

FORGING BILLETS
Andrews Steel Co., Newport, Ky.
Central Steel Co., Massillon, Ohio.
United Alloy Steel Corp., Canton, Ohio.
Wheeling Steel Corp., Wheeling, W. Va.
Wood, Alan, Iron & Steel Co., Widener Bldg., Philadelphia, Pa.

FORGING BILLETS (Alloy and Carbon Steel)
Central Steel Co., Massillon, Ohio.
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.

FORGING MACHINERY
Bliss, E. W., Co., 8 Adams St., Brooklyn, N. Y.
Bradley, C. C., & Son, Inc., 432 N. Franklin St., Syracuse, N. Y.
Mackintosh-Hemphill Co., 12th & Etna Sts., Pittsburgh, Pa.

FORGINGS (Drop)
Bay City Forge Co., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Canton Forge & Axle Co., 2003-35 Deuber Ave., Canton, Ohio.
Champion Mch. & Forging Co., Cleveland, O.
Columbus Forge & Iron Co., Columbus, O.
Drop Forging Co. of New York, Jersey City, N. J.
Eccles, Richard Co., Auburn, N. Y.
General Drop Forge Co., Buffalo, N. Y.
Heppenstall Forge & Knife Co., Arsenal Station, Pittsburgh, Pa.
Kilborn & Bishop Co., 691 Chapel St., New Haven, Conn.
Ladish Drop Forge Co., Cudahy, Wis.
Oliver Iron & Steel Corp., So. 10th & Muriel Sts., Pittsburgh, Pa.
Philadelphia Steel & Iron Co., Commercial Trust Bldg., Philadelphia, Pa.
Pittsburgh Knife & Forge Co., Pittsburgh, Pa.
Pollak Steel Co., The, Cincinnati, O.
Rockford Drop Forge Co., Rockford, Ill.
Scranton Forging Co., Scranton, Pa.
Strieby & Foote Co., 301 Ogden St., Newark, N. J.
Transue & Williams Steel Forging Corp., Alliance, O.
Wilcox, D., Mfg. Co., Mechanicsburg, Pa.
Williams, J. H., & Co., 58 Richards St., Brooklyn, N. Y.

FORGINGS (Iron & Steel)
Bay City Forge Co., Erie, Pa.
Bradley, C. C., & Son, Inc., Syracuse, N. Y.
Canton Forge & Axle Co., 2003-35 Deuber Ave., Canton, Ohio.
Champion Mch. & Forging Co., Cleveland, O.
Columbus Forge & Iron Co., Columbus, O.
Drop Forging Co. of New York, Jersey City, N. J.
Eccles, Richard, Co., Auburn, N. Y.
Federal Signal Co., Albany, N. Y.
General Drop Forge Co., 1756 Elmwood Ave., Buffalo, N. Y.
Heppenstall Forge & Knife Co., Pittsburgh, Pa.
Ladish Drop Forge Co., Cudahy, Wis.
Leard, Wm., Co., The, New Brighton, Pa.
McMyler-Interstate Co., Bedford, O.
Philadelphia Steel & Iron Co., Commercial Trust Bldg., Philadelphia, Pa.
Pollak Steel Co., The, Cincinnati, O.
Rockford Drop Forge Co., Rockford, Ill.
Transue-Williams Steel Forging Corp., Alliance, Ohio.
Vanadium Corp. of America, 120 Broadway, New York, N. Y.
Wilcox, D., Mfg. Co., Mechanicsburg, Pa.

FORMS (Steel for Concrete Construction)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.

FOUNDRY EQUIPMENT & SUPPLIES
American Foundry Equipment Co., Madison Ave. and 46th St., New York City
Sulfex Corp., 264 Jelliff Ave., Newark, N. J.
Whiting Corporation, Harvey, Ill.

FOUNDRY PATTERN PLATES (Steel)
Moltrup Steel Products Co., Beaver Falls, Pa.

FRAMES (Wire Drawing)
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., The, Cuyahoga Falls, O.

FROGS AND SWITCHES
Bethlehem Steel Co., Bethlehem, Pa.

FUEL OIL BURNING SYSTEMS AND OIL PLANTS
Fuller Engineering Co., Fullerton, Pa.
Hagan, George J., Co., Chamber of Commerce Bldg., Pittsburgh, Pa.
Ryan & Co., F. J., Wesley Bldg., Philadelphia, Pa.

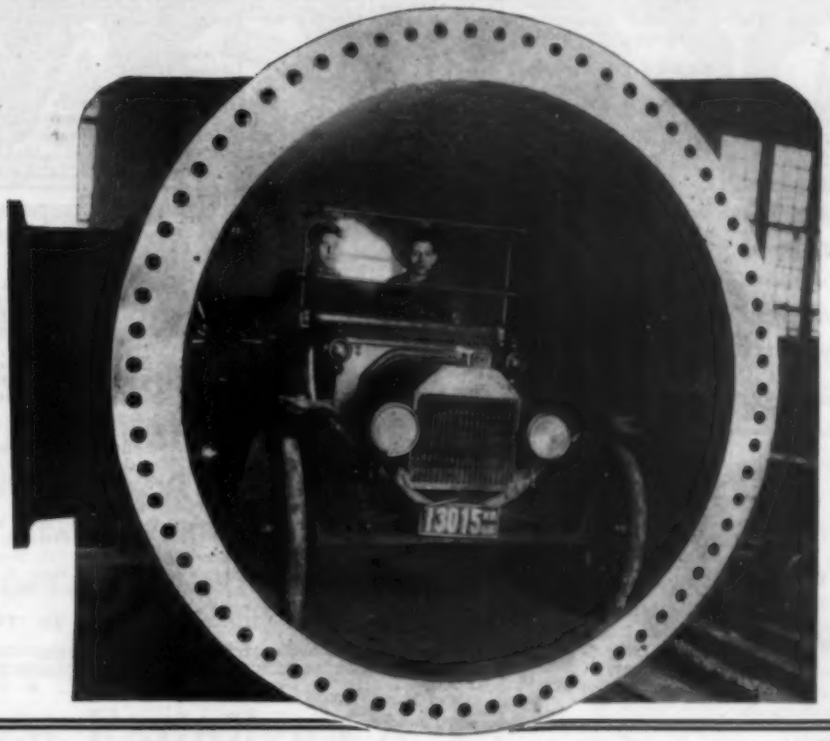
FURNACE APPLIANCES (Water Cooled)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.

FURNACE INSULATION
Armstrong Cork & Insulation Co., 24th Street, Pittsburgh, Pa.
Celite Products Co., 837 Monadnock Bldg., Chicago, Ill.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York, N. Y.

FURNACE SYSTEMS (Open Hearth)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Open Hearth Steel Furnace Co., 300 Westinghouse Bldg., Pittsburgh, Pa.

FURNACES (Annealing, Case Hardening and Heat Treating)
American Industrial Furnace Corp., 185 Devonshire St., Boston, Mass.
Hagan, George J., Co., Chamber of Commerce Bldg., Pittsburgh, Pa.
Ryan & Company, F. J., Wesley Bldg., Philadelphia, Pa.
Tate, Jones & Co., Inc., 914 Empire Bldg., Pittsburgh, Pa.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above



Tee—96" x 96" x 54"
Weight—45,100 lbs.

"WHEELING" Quality Castings

Steel and Iron Castings

STEEL ROLLS SUPER-CHILL ROLLS
SUPER-STEEL ROLLS SAND ROLLS

The Mo-lyb-den-um Roll

ROLLING MILL MACHINERY

SPECIAL MACHINERY

WHEELING MOLD & FOUNDRY CO.
WHEELING, W. VA.

FURNACES (Blast)
Pennsylvania Engrg. Wks., New Castle, Pa.
Smythe, S. R., Co., Pittsburgh, Pa.

FURNACES (Electric)
American Bridge Co.,
71 Broadway, New York, N. Y.
Hagan, George J., Co.,
Chamber of Commerce Bldg.,
Pittsburgh, Pa.
Pittsburgh Electric Furnace Co.,
Union Bank Bldg., Pittsburgh, Pa.
Ryan & Company, F. J.,
Wesley Bldg., Philadelphia, Pa.
Swindell, Wm. & Bros.,
5035 Jenkins Arcade Bldg., Pittsburgh, Pa.

FURNACES (Open Hearth)
Laughlin, Alex., & Co.,
First National Bank Bldg., Pittsburgh, Pa.
Open Hearth Steel Furnace Co.,
300 Westinghouse Bldg., Pittsburgh, Pa.
Smythe, S. R., Co., Pittsburgh, Pa.
Vulcan Furnace & Equipment Co.,
300 Westinghouse Bldg., Pittsburgh, Pa.

FURNACES (Portable)
Dixon, H. L., Co.,
P. O. Box 140, Pittsburgh, Pa.

GAGES, RECORDING (Pressure and Vacuum)
The Bristol Co., Waterbury, Conn.

GALVANIZING
Federal Signal Co., Albany, N. Y.

GALVANIZING KETTLES
Wilfong, Millard F., Iron Works Co.,
Philadelphia, Pa.

GALVANIZING PLANTS
Wilfong, Millard F., Iron Works Co.,
Philadelphia, Pa.

GALVANIZING PLANTS (For Sheets)
Erie Foundry Co., West 12th St., Erie, Pa.
United Engineering & Foundry Co.,
Pittsburgh, Pa.

GANG SLITTERS
Ams, Max, Machine Co., The,
101 Park Ave., New York, N. Y.

GAS BOOSTERS (Rotary Positive Pressure)
Connersville Blower Co., The,
Connersville, Ind.
Roots, P. H. & F. M., Co., Connersville, Ind.

GAS EXHAUSTERS
Connersville Blower Co., Connersville, Ind.

GAS PRODUCER PLANTS
Hagan, Geo. J., Co.,
Chamber of Commerce Bldg.,
Pittsburgh, Pa.
Koppers Co., The, Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
U. S. Cast Iron Pipe & Foundry Co.,
Burlington, N. J.
Wellman-Seaver-Morgan Co.,
7000 Central Ave., Cleveland, O.
Wood, R. D., & Co.,
400 Chestnut St., Philadelphia, Pa.

GAS PRODUCERS
Chapman Engineering Co., Mt. Vernon, O.
Duff Patents Co., Inc., Pittsburgh, Pa.

GAS RECOVERY COKE OVEN AND GAS PLANTS
Koppers Co., The, Pittsburgh, Pa.

GEAR BLANKS
Ladish Drop Forge Co., Cudahy, Wis.
Transue & Williams Steel Forging Corp.,
Alliance, Ohio.

GEAR CUTTING MACHINERY
Whiton, D. E., Machine Co.,
New London, Conn.

GEARS
Jones, W. A., Foundry & Machine Co.,
4437 W. Roosevelt St., Chicago, Ill.

GEARS AND GEAR CUTTING (Iron & Steel)
American Adamite Co., The,
314 Oliver Bldg., Pittsburgh, Pa.
Fawcus Machine Co.,
2818 Smallman St., Pittsburgh, Pa.
Horsburgh & Scott Co.,
5114 Hamilton Ave., Cleveland, O.
Johnson, Carlyle, Machine Co.,
Manchester, Conn.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Niles-Bement-Pond Co.,
111 Broadway, New York, N. Y.
Nuttall, R. D., Co., Pittsburgh, Pa.
Ross-Meehan Foundries, Chattanooga, Tenn.
Simonds Mfg. Co.,
25th St. & Liberty Ave., Pittsburgh, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Wappat Gear Works,
Mead St., at Braddock Ave., Pittsburgh, Pa.

GEARS (Automobile, Truck, Tractor)
General Electric Co., Schenectady, N. Y.
Nuttall, R. D., Co., Pittsburgh, Pa.

GEARS (Herringbone)
Falk Corporation, The, Milwaukee, Wis.
Fawcus Machine Co.,
2818 Smallman St., Pittsburgh, Pa.
Niles-Bement-Pond Co.,
111 Broadway, New York City
Nuttall, R. D., Co., Pittsburgh, Pa.

GEARS (Machine Molded)
Taylor-Wilson Manufacturing Co.,
McKees Rocks, Pa.

GEARS (Rawhide)
Chicago Rawhide Mfg. Co.,
1301 Elston Ave., Chicago, Ill.
Horsburgh & Scott Co.,
5114 Hamilton Ave., Cleveland, O.
Nuttall, R. D., Co., Pittsburgh, Pa.

GEARS (Reverse Marine)
General Electric Co., Schenectady, N. Y.
Johnson, Carlyle, Machine Co.,
Manchester, Conn.

GENERATING SETS
General Electric Co., Schenectady, N. Y.

GENERATORS (Direct and Alternate Current)
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

GLASS CLEANERS (Liquid and Powder)
Skybryte Co., The,
Bangor Bldg., Cleveland, Ohio.

GRATING (Flooring, Subway, Step and other Purposes)
Irving Iron Works Co.,
Long Island City, N. Y.

GREASE (Lubricating)
Bassick Mfg. Co.,
361 Superior Ave., Chicago, Ill.
Ohio Grease Co., Loudonville, Ohio.

GRINDERS (Crankshaft)
Landis Tool Co., Waynesboro, Pa.

GRINDERS (Electric Pneumatic-Portable)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York City
Cleveland Pneumatic Tool Co.,
3734 E. 78th St., Cleveland, O.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.

GRINDERS (Roll)
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES
Landis Tool Co., Waynesboro, Pa.

GRINDING PANS
Bonnot Co., The, Canton, Ohio.
Clearfield Machine Shops, Clearfield, Pa.
Hadfield-Penfield Steel Co., Bucyrus, Ohio.
National Engineering Co.,
Machinery Hall Bldg.,
549 W. Washington Blvd., Chicago, Ill.
Phillips & McLaren Co., Pittsburgh, Pa.

HAMMERS (Chipping, Riveting and Calking)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York City
Cleveland Pneumatic Tool Co.,
3734 E. 78th St., Cleveland, O.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.

HAMMERS (Drop)
Bliss, E. W., Co.,
8 Adams St., Brooklyn, N. Y.
Chambersburg Engrg. Co.,
Chambersburg, Pa.
Erie Foundry Co., West 12th St., Erie, Pa.
Long & Allstatter Co., Hamilton, Ohio.
Niles-Bement-Pond Co.,
111 Broadway, New York City
Toledo Machine & Tool Co., Toledo, O.

HAMMERS (Power)
Bradley, C. C., & Son, Inc., Syracuse, N. Y.
Cleveland Punch & Shear Works Co.,
Cleveland, Ohio.
Erie Foundry Co., West 12th St., Erie, Pa.
Niles-Bement-Pond Co.,
111 Broadway, New York City
Yoder Co., The,
5510 Walworth St., Cleveland, O.

HAMMERS (Rawhide)
Chicago Rawhide Mfg. Co.,
1301 Elston Ave., Chicago, Ill.

HAMMERS (Steam)
Chambersburg Engineering Co.,
Chambersburg, Pa.
Erie Foundry Co., West 12th St., Erie, Pa.

HANGERS (Shaft)
Hyatt Roller Bearing Co., Newark, N. J.

HEATERS (Feed Water)
Harrisburg Pipe & Pipe Bending Co.,
Harrisburg, Pa.

HOISTING MACHINERY
Brown Hoisting Machinery Co.,
4403 St. Clair Ave., Cleveland, Ohio.
Cleveland Crane & Engrg. Co., Wickliffe, O.
Illinois Malleable Iron Co., Chicago, Ill.
McMyler-Interstate Co., Bedford, O.
Orton & Steinbrenner Co.,
608 S. Dearborn St., Chicago, Ill.
Shepard Electric Crane & Hoist Co.,
358 Schuyler Ave., Montour Falls, N. Y.
Treadwell Engineering Co., Easton, Pa.

HOISTS (Chain)
Shepard Electric Crane & Hoist Co.,
358 Schuyler Ave., Montour Falls, N. Y.

HOISTS (Electric)
Euclid Crane & Hoist Co., Dept. B.,
Euclid, Ohio.
Link-Belt Co., Chicago, Ill.
Milwaukee Electric Crane & Mfg. Co.,
Milwaukee, Wis.
Northern Engineering Works,
214 Chene St., Detroit, Mich.
Pawling & Harnischfeger Co.,
Milwaukee, Wis.
Shepard Electric Crane & Hoist Co.,
358 Schuyler Ave., Montour Falls, N. Y.
Stamp Electric Hoist Co.,
968 E. 69th Place, Cleveland, O.

HOISTS (Pneumatic)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York City
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Shepard Electric Crane & Hoist Co.,
358 Schuyler Ave., Montour Falls, N. Y.

HOLDERS (Tool)—See TOOL HOLDERS

HOOPS AND BANDS
Bourne-Fuller Co., Hanna Bldg., Cleveland, O.
Ryerson, Joseph T., & Son., Inc.,
Chicago, Ill.
West Leechburg Steel Co., Pittsburgh, Pa.

HOOPS, BANDS AND SHAPES (Galvanized)
McCalla, Harold, Co., The,
Pier 56, North Wharves, Delaware River,
Philadelphia, Pa.

HOSE (Pneumatic)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York City
Ingersoll-Rand Co., 11 Broadway, N. Y. C.

HOT BEDS
McKee, Willis, 2422 Euclid Ave.,
Cleveland, O.
Morgan Construction Co., Worcester, Mass.
Treadwell Engineering Co., Easton, Pa.

HOT BLAST STOVES
Riter-Conley Co.,
Oliver Bldg., Pittsburgh, Pa.

HYDRAULIC MACHINERY
Allis Chalmers Mfg. Co., Milwaukee, Wis.
Bethlehem Steel Co., Bethlehem, Pa.

HYDRAULIC MACHINERY (Punches and Shears)
Chambersburg Engineering Co.,
Chambersburg, Pa.

HYDRAULIC PRESSES—See PRESSES (Hydraulic)

INDUSTRIAL HAULAGE EQUIPMENT
General Electric Co., Schenectady, N. Y.

INGOT MOLDS
American Adamite Co., The,
314 Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdy. & Mach. Co.,
Birdsboro, Pa.
Penn Mold & Mfg. Co., Wheeling, W. Va.
Valley Mould & Iron Corp.,
Sharpsville, Pa.

INGOTS (Steel)
American Rolling Mill Co., Middletown, O.
McConway & Torley Co.,
Arsenal Station, Pittsburgh, Pa.

INSTRUMENTS (Electric Indicating and Recording)
General Electric Co., Schenectady, N. Y.

INSULATING BRICK
Armstrong Cork & Insulation Co.,
24th Street, Pittsburgh, Pa.
Celite Products Co.,
837 Monadnock Bldg., Chicago, Ill.
Quigley Furnace Specialties Co.,
26 Cortlandt St., New York, N. Y.

INSULATION (Furnaces, Boiler Settings Ovens, Steam Pipe, Etc.)
Armstrong Cork & Insulation Co.,
24th Street, Pittsburgh, Pa.
Celite Products Co.,
837 Monadnock Bldg., Chicago, Ill.
Quigley Furnace Specialties Co.,
26 Cortlandt St., New York, N. Y.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

CASTINGS

HIGH GRADE
STEEL CASTINGS
Open Hearth Process
THE COMMERCIAL STEEL CASTING CO.
MARION, OHIO
Shipping Facilities on Five Railroads

ACID OPEN HEARTH
STEEL CASTINGS
EXCLUSIVELY
ATLAS
Steel Casting Company
General Offices and Works
BUFFALO, N. Y.
New York Office: 200 Fifth Ave.

Sharon Foundry Co.
STEEL CASTINGS
ACID OPEN HEARTH
We solicit your business and guarantee satisfaction
Sharon, Pa.

OHIO STEEL CASTINGS
Particular attention to small castings
Careful molding; electric annealing; fast machining qualities; delivery requirements met.
THE OHIO STEEL FOUNDRY CO.
Springfield, Ohio
Larger Castings made in our Foundries at Lima and Bucyrus, O.

Reliance Steel Casting Co.
Manufacturers of
Steel Castings
SINCE 1898
PITTSBURG, PA.

MILWAUKEE STEEL FOUNDRY CO.
101-131 South Water St.
MILWAUKEE, WIS.
STEEL CASTINGS
HEROULT ELECTRIC FURNACE EQUIPMENT

READING
STEEL CASTING CO. Inc.
READING, PA.
The Largest Manufacturers of
MISCELLANEOUS STEEL CASTINGS
Converter Castings ... 1 to 1,000 Lbs.
Acid Open Hearth Castings ... 25 to 36,000 Lbs.

SERVICE SMALL—STEEL—CASTINGS
THE WEST STEEL CASTING CO.
CLEVELAND OHIO
"HE PROFITS MOST WHO SERVES BEST" QUALITY

IRON
Interstate Iron & Steel Co.,
104 So. Michigan Ave., Chicago, Ill.
Lockhart Iron & Steel Co., Pgh., Pa.
Morris, Wheeler & Co.,
30th & Locust Sts., Philadelphia, Pa.
Newport Rolling Mills Co., Newport, Ky.
Penn Iron & Steel Co., Creighton, Pa.

IRON (Bar)
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Co., Hanna Bldg., Cleveland, O.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Tuttle, Charles A., Auburn, N. Y.

IRON (Chain)
Bethlehem Steel Co., Bethlehem, Pa.
Penn Iron & Steel Co., Creighton, Pa.

IRON (Engine Bolt)
Bethlehem Steel Co., Bethlehem, Pa.
Penn Iron & Steel Co., Creighton, Pa.

IRON (Horseshoe)
Tuttle, Charles A., Auburn, N. Y.

IRON (Silver)
Globe Iron Co., Jackson, O.
Keokuk Electro-Metals Co.,
Corn Exchange Bank Bldg., Chicago, Ill.

IRON (Staybolt)
Bethlehem Steel Co., Bethlehem, Pa.
Penn Iron & Steel Co., Creighton, Pa.
Tuttle, Charles A., Auburn, N. Y.

IRON ORE
Cleveland-Cliffs Iron Co., Cleveland, O.
Hanna, The M. A., Co., Cleveland, O.
Hillman Coal & Coke Co.,
First Nat'l Bank Bldg., Pittsburgh, Pa.
Iron Trade Products Co.,
903 Farmers Bank Bldg., Pittsburgh, Pa.
Marquette Ore Co.,
Kirby Bldg., Cleveland, O.
Park & Williams, Inc.,
Real Estate Trust Bldg., Philadelphia, Pa.
Pickands, Mather & Co.,
Western Reserve Bldg., Cleveland, O.
Quinn, Clement K., & Co., Duluth, Minn.
Snyder, W. P., & Co., Pittsburgh, Pa.
Tod Stambaugh Co.,
Hanna Bldg., Cleveland, O.
Witherbee, Sherman & Co.,
2 Rector St., New York, N. Y.

JOISTS AND STUDS (Pressed Steel)
Central Steel Co., Massillon, Ohio.
Truscon Steel Co.,
250 Lafayette Blvd., Detroit, Mich.

KEYS AND COTTERS (Machine)
Leard, Wm., Co., The, New Brighton, Pa.
Moltrup Steel Products Co.,
Beaver Falls, Pa.
Morton Mfg. Co., Muskegon Heights, Mich.
Standard Gauge Steel Co., Beaver Falls, Pa.

KEYSEATING MACHINES
Morton Mfg. Co., Muskegon Heights, Mich.

KNIVES AND SHEAR BLADES — See SHEAR BLADES AND KNIVES

LADLES
Pennsylvania Engrg. Works, New Castle, Pa.
Riter-Conley Co., Oliver Bldg., Pittsburgh Pa.

LADLES (Sleeves and Nozzles)
Laclede-Christy Clay Products Co.,
St. Louis, Mo.

LATH (Expanded Metal)
Central Steel Co., Massillon, Ohio.
Truscon Steel Co.,
250 Lafayette Blvd., Detroit, Mich.

LATHE DOGS (Safety)
Williams, J. H., & Co.,
58 Richards St., Brooklyn, N. Y.

LATHES
Niles-Bement-Pond Co.,
111 Broadway, New York, N. Y.
Ryerson, Jos. T., & Son, Inc.,
16th and Rockwell Sts., Chicago, Ill.

LATHES (Roll Turning)
Lewis Foundry & Machine Co.,
Farmers Bank Bldg., Pittsburgh, Pa.
Standard Engineering Co., Ellwood City, Pa.
United Engineering & Foundry Co.,
Pittsburgh, Pa.
Youngstown Foundry & Machine Co.,
Youngstown, Ohio.
Cleveland, Ohio.

LEATHER BELTING — See BELTING (Leather)

LEAD POTS
Calorizing Co., The,
Oliver Bldg., Pittsburgh Pa.

LETTERHEADS (Engraved)
Wiggins, John B., Co.,
705 Peoples Gas Bldg., Chicago, Ill.

LEVELING MACHINES
United Engineering & Foundry Co.,
Pittsburgh, Pa.

LIFTING MAGNETS
Cutler-Hammer Mfg. Co., The,
Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.
Ohio Electric & Controller Co.,
5900 Maurice Ave., Cleveland, O.

LOCOMOTIVE CRANES—See CRANES (Locomotive)

LOCOMOTIVES
Porter, H. K., Co.,
Union Bank Bldg., Pittsburgh, Pa.

LOCOMOTIVES (Electric)
Atlas Car & Mfg. Co.,
Dept. E., Cleveland, O.

LOCOMOTIVES (Storage Battery)
Atlas Car & Mfg. Co., Cleveland, O.

LUBRICANTS (Grease)
Bassick Mfg. Co.,
361 Superior Ave., Chicago, Ill.
Ohio Grease Co., Loudonville, Ohio.

LUBRICATORS (Machinery)
Bassick Mfg. Co.,
361 Superior Ave., Chicago, Ill.

LUBRICATORS (Steam Cylinder)
Ohio Grease Co., Loudonville, Ohio.

MACHINE KEYS—See KEYS AND COTTER (Machine)

MACHINE WORK
Air Tight Steel Tank Co.,
Mansion & Gloster Sts., Pittsburgh, Pa.
Bettcher Stamping & Mfg. Co.,
3106 W. 61st St., Cleveland, O.
Bliss, E. W., Co.,
8 Adams St., Brooklyn, N. Y.
Federal Signal Co., Albany, N. Y.
Johnson, Carlyle, Machine Co.,
Manchester, Conn.
York Milk Machinery Co., York, Pa.

MACHINERY (Lubrication)
Bassick Mfg. Co.,
361 Superior Ave., Chicago, Ill.

MACHINERY (Second Hand)
See Page 91.

MACHINERY (Special)
Air Reduction Sales Co.,
342 Madison Ave., New York, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss, E. W., Co.,
8 Adams St., Brooklyn, N. Y.
Chambersburg Engineering Co.,
Chambersburg, Pa.
Connecticut Tool & Engrg. Co.,
403 E. Washington St., Bridgeport, Conn.
Lammert & Mann Co., Chicago, Ill.
National Roll & Foundry Co., Avonmore, Pa.
Smith Gas Engineering Co., Dayton, Ohio.
Wheeling Mold & Foundry Co.,
Wheeling, W. Va.

MAGNESITE
General Refractories Co.,
117 So. 16th St., Philadelphia, Pa.
Harbison-Walker Refractories Co.,
Farmers Bank Bldg., Pittsburgh, Pa.

MAGNETS (Lifting)—See LIFTING MAGNETS

MANGANESE METALS
Electro Metallurgical Sales Corp.,
30 E. 42nd St., New York, N. Y.

MATERIAL HANDLING MACHINERY
Browning Co., The,
E. 162nd St. & Waterloo Rd., Cleveland, O.
McMyler Interstate Co., Bedford, O.

MELTING BAR (Low Phosphorus)
Penn Iron & Steel Co., Creighton, Pa.

MERCHANT MILL EQUIPMENT
Morgan Construction Co., Worcester, Mass.
Treadwell Engineering Co., Easton, Pa.

METAL CLEANER
Ford, J. B., Co., The, Wyandotte, Mich.

METAL CUTTING MACHINES (High Speed)
Racine Tool & Machine Co., Racine, Wis.

METAL SPECIALTIES AND PARTS
Budd, E. G., Mfg. Co.,
Specialty Dept., Philadelphia, Pa.
Erdle Perforating Co., Rochester, N. Y.

METAL (Acid and Anti-Friction)
Alliance Brass & Bronze Co., Alliance, Ohio.

METAL (Perforated)
Erdle Perforating Co., Rochester, N. Y.

METALS (Nonferrous)
Titanium Alloy Mfg. Co.,
Niagara Falls, N. Y.

METAL SPECIALTIES (Brass and Bronze)
Everitt Co., The,
271 Franklin St., Boston, Mass.

METAL STAMPINGS—See STAMPINGS

METAL WORKING MACHINES — See SHEET METAL WORKING MACHINERY

METERS (Gas and Air)
Connersville Blower Co., The,
Connersville, Ind.
Cutler-Hammer Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.

MILLING MACHINES
Niles-Bement-Pond Co.,
111 Broadway, New York, N. Y.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
16th and Rockwell Sts., Chicago, Ill.

MILLS (Blooming, Universal Plate, Sheet, Etc.)
Lewis Foundry & Machine Co.,
Farmers Bank Bldg., Pittsburgh, Pa.
Mackintosh-Hemphill Co.,
12th and Etna Sts., Pittsburgh, Pa.
National Roll & Foundry Co., Avonmore, Pa.
Treadwell Engineering Co., Easton, Pa.

MINING MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

MIXERS (Sand)
National Engineering Co.,
Machinery Hall Bldg.,
549 W. Washington St., Chicago, Ill.

MIXING, KNEADING, TEMPERING AND PUGGING MACHINERY
Hadfield-Penfield Steel Co., The,
Bucyrus, Ohio.
National Engineering Co.,
Machinery Hall Bldg.,
549 W. Washington St., Chicago, Ill.

MOLDS (Ingot)—See INGOT MOLDS

MOLD OVENS—See CORE OVENS

MOLDING MACHINES
American Foundry Equipment Co.,
366 Madison Ave., New York, N. Y.
Herman Pneumatic Machine Co.,
806 Union Bank Bldg., Pittsburgh, Pa.

MONEL METAL
International Nickel Co.,
67 Wall St., New York, N. Y.

MOTORS (Electric)
Electric Controller & Mfg. Co.,
2700 E. 79th St., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

MUCK BAR
Bethlehem Steel Co., Bethlehem, Pa.
Penn Iron & Steel Co., Creighton, Pa.

NAILS
American Steel & Wire Co.,
208 S. La Salle St., Chicago, Ill.
Pittsburgh Steel Co.,
P. O. Box 72, Pittsburgh, Pa.
Youngstown Sheet & Tube Co.,
Youngstown, O.

NICKEL
American Nickel Corp., Clearfield, Pa.
International Nickel Co.,
67 Wall St., New York, N. Y.
United States Nickel Co.,
New Brunswick, N. J.

NICKEL STEEL (Cold Drawn)
Bethlehem Steel Co., Bethlehem, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.

NITROGEN
Air Reduction Sales Co.,
342 Madison Ave., New York, N. Y.
Linde Air Products Co.,
30 E. 42nd St., New York, N. Y.

NUTS
Bethlehem Steel Co., Bethlehem, Pa.
Clark Bros. Bolt Co., Milldale, Conn.
Lake Erie Bolt & Nut Co.,
915 E. 63rd St., Cleveland, Ohio
Lake Erie Bolt & Nut Co.,
915 E. 63rd St., Cleveland, O.
Oliver Iron & Steel Corp., Pittsburgh, Pa.
Rockford Bolt Co.,
220 Mill St., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co.,
Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc.,

OIL (Fuel)—See FUEL OIL

OIL (Lubricating)
Ohio Grease Co., Loudonville, Ohio.

OPEN-HEARTH FURNACES — See FURNACES (Open Hearth)

ORE HANDLING MACHINERY
Brown Hoisting Machinery Co.,
4403 St. Clair Ave., Cleveland, O.

OVENS (Coke By-Product Recovery)
Koppers Co., The, Pittsburgh, Pa.

OXY-ACETYLENE
Linde Air Products Co.
30 E. 42nd St., New York, N. Y.

OXY-ACETYLENE WELDING AND CUTTING—See WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene Process)

OXYGEN AND HYDROGEN
International Oxygen Co., Newark, N. J.

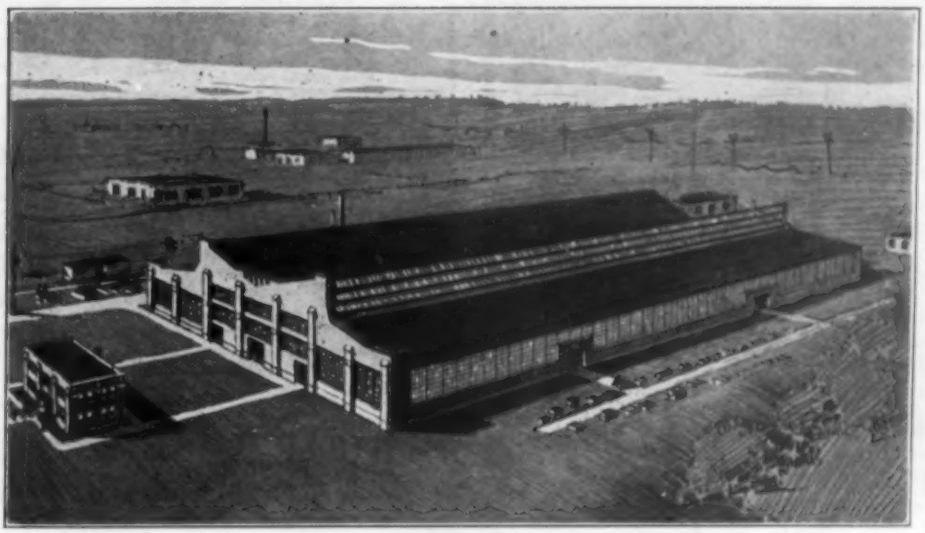
OXYGEN IN CYLINDERS
Air Reduction Sales Co.,
342 Madison Ave., New York, N. Y.
Linde Air Products Co.,
30 E. 42nd St., New York, N. Y.

PACKING (Leather)
Chicago Rawhide Mfg. Co.,
1301 Elston Ave., Chicago, Ill

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

BLACKWOOD

"Guaranteed"



Our new *plant* has been especially designed and equipped to manufacture Super-Quality Electric Steel Castings. It has a capacity of 300 tons a month.

This plant, plus our experience which dates back into the pioneer days of electric steel, enables us to manufacture Electric Steel Castings that are *FULLY GUARANTEED.*

And back of this plant and our experience lies a reputation for quality, integrity and strict fulfillment of delivery promises, that we will maintain at all costs.

May we serve you?

BLACKWOOD ELECTRIC STEEL CORPORATION

Parkersburg, W. Va.

SALES OFFICES:

New York	Chicago	St. Louis	Pittsburgh
Cleveland	Detroit	Minneapolis	Boston

ELECTRIC STEEL CASTINGS

PAINTS
Thompson & Co.,
857 North Ave., Pittsburgh, Pa.

PATTERN PLATES (Steel)
Moltrup Steel Products Co., Beaver Falls, Pa.

PATTERNS (Wood & Metal)
Seneca Pattern Works, Seneca Falls, N. Y.

PERFORATED METAL
Erdle Perforating Co.,
York St. and B. R. & P. R. R.,
Rochester, N. Y.

PICKLING TANKS
Hauser-Stander Tank Co., The,
Ammen & B. & O. R. R., Cincinnati, O.

PICKS, MATTOCKS, ETC.
Oliver Iron & Steel Corp.,
So. 10th & Muriel Sts., Pittsburgh, Pa.

PIG IRON
Addy, The Matthew, Co., Cincinnati, O.
Adrian Furnace Co., Du Bois, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Cleveland-Cliffs Iron Co., Cleveland, O.
Crocker Bros., 21 E. 40th St., N. Y. C.
Delaware River Steel Co., Chester, Pa.
Donner Steel Co., Inc.,
P. O. Box 1000, Buffalo, N. Y.
Eaton, Rhodes & Co., Cincinnati, Ohio.
Globe Iron Co., Jackson, Ohio.
Hanna, The M. A., Co., Cleveland, O.
Hickman, Williams & Co.,
1343 Oliver Bldg., Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
Iron Trade Products Co.,
903 Farmers Bank Bldg., Pittsburgh, Pa.
Lavino, E. J., & Co.,
Bullitt Bldg., Philadelphia, Pa.
Mohr, J. J., & Son, Bullitt Bldg., Phila.
Park & Williams, Inc.,
Real Estate Trust Bldg., Philadelphia, Pa.
Pickands, Mather & Co.,
Western Reserve Bldg., Cleveland, O.
Pilling & Co.,
Real Estate Trust Bldg., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, Ohio.
Runyon, W. C., & Co.,
350 Madison Ave., New York, N. Y.
Snyder, W. P., & Co., Pittsburgh, Pa.
Stewart Furnace Co.,
1335 Kirby Bldg., Cleveland, O.
Valley Mould & Iron Corp., Sharpsville, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
Wickwire-Spencer Steel Corp.,
41 E. 42nd St., New York, N. Y.
Witherbee, Sherman & Co.,
2 Rector St., New York City
Wood, Alan, Iron & Steel Co.,
Widener Bldg., Philadelphia, Pa.

PIG IRON (Charcoal)
Rogers, Brown & Co., Cincinnati, Ohio.

PILE DRIVERS
Browning Co., The,
E. 162nd St. & Waterloo Rd., Cleveland.
McMyler Interstate Co., Bedford, Ohio.
Orton & Steinbrenner Co.,
608 S. Dearborn St., Chicago, Ill.

PILING (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.

PINIONS—See GEARS AND GEAR CUTTING

PINS
Champion Rivet Co., The,
E. 105th St. & Harvard Ave., Cleveland

PIPE (Riveted Steel)
Abendroth & Root Mfg. Co.,
Woolworth Bldg., New York, N. Y.
Petroleum Iron Works Co., of Ohio,
Sharon, Pa.

PIPE (Spiral Riveted)
Abendroth & Root Mfg. Co., New York, N. Y.

PIPE (Standard)
Wheeling Steel Corp., Wheeling, W. Va.

PIPE (Steel)
Calorizing Co., The,
Oliver Bldg., Pittsburgh, Pa.
Central Tube Co.,
First National Bank Bldg., Pittsburgh, Pa.
Crane Co., The,
836 S. Michigan Ave., Chicago, Ill.
Jones & Laughlin Steel Corp.,
Pittsburgh, Pa.
National Tube Co., Frick Bldg., Pittsburgh
Republic Iron & Steel Co., Youngstown, O.
Youngstown Sheet & Tube Co.,
Youngstown, Ohio.

PIPE (Welded)
Pittsburgh Piping & Equipment Co.,
35th and Charlotte Sts., Pittsburgh, Pa.

PIPE (Wrought Iron)
Youngstown Sheet & Tube Co., The,
Youngstown, Ohio.

PIPE (Wrought Steel)
Central Tube Co.,
First National Bank Bldg., Pittsburgh, Pa.
National Tube Co.,
Frick Bldg., Pittsburgh, Pa.

PIPE BENDS
Crane Co., The,
836 S. Michigan Ave., Chicago, Ill.
Pittsburgh Piping & Equipment Co.,
Pittsburgh, Pa.

PIPE FITTINGS
Illinois Malleable Iron Co., Chicago, Ill.
Jenkins Bros., 80 White St., New York City
Pittsburgh Piping & Equip. Co., Pittsburgh

PIPE MILL MACHINERY
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PIPE STRAIGHTENING MACHINES
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PIPE CUTTING AND THREADING MACHINERY
Standard Engrg. Co., Ellwood City, Pa.

PIPE WRENCHES — See WRENCHES (Pipe)

PIPING CONTRACTORS
American Foundry & Construction Co.,
4700 2nd Ave., Pittsburgh, Pa.
Pittsburgh Piping & Equipment Co.,
Pittsburgh, Pa.

PLANERS AND SHAPERS
Cleveland Punch & Shear Works,
Cleveland, Ohio.
Morton Mfg. Co., Muskegon Heights, Mich.
Niles-Bement-Pond Co.,
111 Broadway, New York City
Ohio Machine Tool Co., Kenton, Ohio.
Ryerson, Jos. T., & Son, Inc.,
16th and Rockwell Sts., Chicago, Ill.

PLATE CASTORS
Hyatt Roller Bearing Co., Newark, N. J.

PLATES
Morris, Wheeler & Co.,
30th & Locust Streets, Philadelphia, Pa.

PLATES (Rolled Steel—Floor)
American Pressed Steel Co.,
Commercial Trust Bldg., Philadelphia, Pa.
Wood, Alan, Iron & Steel Co.,
Philadelphia, Pa.

PLATES (Iron and Steel)
American Pressed Steel Co.,
Commercial Trust Bldg., Philadelphia, Pa.
Carbon Steel Co., Pittsburgh, Pa.

PLATES (Sheared and Universal)
Allegheny Steel Co., Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept.,
Chicago, Ill.
Inland Steel Co.,
First National Bank Bldg., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Wood, Alan, Iron & Steel Co.,
Philadelphia, Pa.
Youngstown Sheet & Tube Co.,
Youngstown, O.

PLATES (Steel)
American Rolling Mill Co., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co.,
431 Carnegie Bldg., Pittsburgh, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Inland Steel Co.,
First National Bank Bldg., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
Morris & Bailey Steel Division, Oliver Iron & Steel Corp.,
Wilson Station, Pittsburgh, Pa.
Newport Rolling Mills Co., Newport, Ky.
Otis Steel Co., Cleveland, O.
Phillips, F. R., & Sons Co.,
Pennsylvania Bldg., Philadelphia, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
Worth Steel Co., Claymont, Del.

PLATES—(Terne and Tin) — See TIN PLATE

PLUMBING EQUIPMENT
Crane Co., The,
836 S. Michigan Ave., Chicago, Ill.

PNEUMATIC TOOLS—See TOOLS (Penumatic)

POLES (Tubular Steel)
National Tube Co., Frick Bldg., Pittsburgh

POWDERED COAL EQUIPMENT
Bonnot Co., The, Canton, Ohio.
Fuller Engineering Co., Fullerton, Pa.

PRESSED STEEL PARTS—See STAMPINGS

PRESSES
Ams, Max, Machine Co.,
101 Park Ave., New York City
Birdsboro Steel Fdry. & Mach. Co.,
Birdsboro, Pa.
Bliss, E. W., Co.,
8 Adams St., Brooklyn, N. Y.
Chambersburg Engineering Co.,
Chambersburg, Pa.
Cleveland Punch & Shear Works Co.,
Cleveland, Ohio.
Erie Foundry Co., Erie, Pa.
Logemann Bros. Co.,
3120 Burleigh St., Milwaukee, Wis.
Mackintosh-Hemphill Co.,
12th & Etna Sts., Pittsburgh, Pa.
Toledo Machine & Tool Co., Toledo, O.
Wood, R. D., & Co.,
400 Chestnut St., Philadelphia, Pa.

PRESSES (Forging)
United Engineering & Foundry Co.,
Pittsburgh, Pa.

PRESSES (Hydraulic)
Bethlehem Steel Co., Bethlehem, Pa.
Bliss, E. W., Company,
8 Adams St., Brooklyn, N. Y.
Chambersburg Engineering Co.,
Chambersburg, Pa.
Logemann Brothers Co.,
3120 Burleigh Ave., Milwaukee, Wis.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Niles-Bement-Pond Co.,
111 Broadway, New York City
Wood, R. D., & Co.,
400 Chestnut St., Philadelphia, Pa.

PRESSES (Metal Drawing, Etc.)
Ams, Max, Machine Co., The,
101 Park Ave., New York, N. Y.
Bliss, E. W., Company,
8 Adams St., Brooklyn, N. Y.

PRESSES (Scrap Bundling)
Logemann Brothers Co.,
3120 Burleigh Ave., Milwaukee, Wis.

PRESSES (Straightening)
Chambersburg Engineering Co.,
Chambersburg, Pa.
United Engineering & Foundry Co.,
Pittsburgh, Pa.

PUMPS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Buffalo Forge Co.,
490 Broadway, Buffalo, N. Y.
Chambersburg Engineering Co.,
Chambersburg, Pa.
Connersville Blower Co., The,
Connersville, Ind
Platt Iron Works, Dayton, Ohio.

PUMPS (Boiler Feed)
Ingersoll-Rand Co., 11 Broadway, N. Y. C.

PUMPS (Centrifugal)
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Kane & Roach,
Niagara and Shonnard Sts.,
Syracuse, N. Y.
Morris Machine Works,
Baldwinsville, N. Y.
Platt Iron Works, Dayton, Ohio.

PUMPS (Hydraulic)
Logemann Brothers Co.,
3120 Burleigh Ave., Milwaukee, Wis.

PUNCHES
Richards, I. P., Co., Prividence, R. I.

PUNCHES (Multiple)
Thomas Spacing Machine Co.,
Fulton Bldg., Pittsburgh, Pa.

PUNCHES AND DIES
Richards, I. P., Co., Providence, R. I.

PUNCHING AND SHEARING MACHINERY
Bliss, E. W., Co.,
8 Adams St., Brooklyn, N. Y.
Buffalo Forge Co.,
490 Broadway, Buffalo, N. Y.
Chambersburg Engineering Co.,
Chambersburg, Pa.
Cleveland Punch & Shear Works Co.,
Cleveland, O.
Long & Allstatter Co., Hamilton, O.
Mackintosh-Hemphill Co.,
12th & Etna Sts., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc.,
16th and Rockwell Sts., Chicago, Ill.
Wood, R. D., & Co.,
400 Chestnut St., Philadelphia, Pa.

PYROMETERS (Indicating and Recording)
Bristol Co., The, Waterbury, Conn.

RACKS (Machine)
Standard Gauge Steel Co., Beaver Falls, Pa.

RAILS
Carnegie Steel Co.,
431 Carnegie Bldg., Pittsburgh, Pa.
Hyman-Michaels Co.,
531 Peoples Gas Bldg., Chicago, Ill.
Illinois Steel Co., Chicago, Ill.
Tenn. Coal, Iron & R. R. Co.,
Birmingham, Ala.

RAILS (Girder)
Bethlehem Steel Co., Bethlehem, Pa.

REFRACTORIES
Ashland Fire Brick Co., Ashland, Ky.
Bour, L. J., Refractories Co., Inc., The,
Scranton, Pa.
Brighton Fire Brick Co.,
Block House Run, New Brighton, Pa.
Crescent Refractories Co., Curwensville, Pa.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

CASTINGS

DUQUESNE STEEL FOUNDRY CO.
PITTSBURGH, PA.
STEEL ROLLS
AND
STEEL CASTINGS

MAYNARD ELECTRIC STEEL CASTING COMPANY
2-12 Kilbourn Rd. MILWAUKEE, WIS.
ELECTRIC STEEL CASTINGS
from 1 to 5000 lbs. each

Pouring 125 Ton Ingot Mould

Gray-Iron
and
Semi-Steel
Castings
200 Tons Capacity
BUFFALO FOUNDRY AND MACHINE COMPANY
1571 Fillmore Ave.
BUFFALO, N. Y.

Certified Malleable Iron Castings
Belle City Malleable Iron Company
RACINE, WISCONSIN

Refined Electric Steel Castings
Racine Steel Castings Company
RACINE, WISCONSIN

FEDERAL STEEL FOUNDRY CO.
Foot of Reaney Street CHESTER, PA.
OPEN HEARTH STEEL CASTINGS
Heavy Hydraulic Work a Specialty
QUICK DELIVERY QUALITY CASTINGS

ELECTRIC STEEL CASTINGS
CHICAGO STEEL FOUNDRY CO.

ELECTRIC
STEEL CASTINGS
Farrell-Cheek Steel Foundry Co.
Sandusky, Ohio

HIGH GRADE SMALL
ELECTRIC STEEL CASTINGS
Also
Chrome, Nickel and Vanadium Alloy Steel Castings
The Crucible Steel Casting Co.
CLEVELAND, O.

SERVICE *QUALITY*
Geo. H. Smith Steel Casting Co.
ELECTRIC STEEL CASTINGS
Milwaukee, Wis.
Chicago Office: 111 W. Washington St.

Temple Malleable Iron & Steel Co.
Office 312 Harrison Bldg. PHILADELPHIA
High Grade Clean CASTINGS
Foundry TEMPLE, PA.
Certified Malleable Iron Castings

EASTERN
ELECTRIC OPEN HEARTH
STEEL CASTINGS
NEWARK N J

REFINED ELECTRIC
STEEL CASTINGS
VALUE PROMPT DELIVERY
PELTON STEEL CO.
Milwaukee, Wisconsin
Chicago Office, 628 McCormick Bldg.

REFRACTORIES (Continued)
Dover Fire Brick Co., 830 Cuyahoga Bldg., Cleveland, O
General Refractories Co., 117 So. 16th St., Philadelphia, Pa.
Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.
Ironton Fire Brick Co., The, Ironton, O.
Kier Fire Brick Co., Oliver Bldg., Pittsburgh, Pa.
Laclede Christy Clay Products Co., St. Louis, Mo.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Mutton Hollow Fire Brick Co., Woodbridge, N. J.
Queen's Run Refractories Co., Inc., Lock Haven, Pa.
Soisson, Joseph, Fire Brick Co., Connellsville, Pa.
Stowe-Fuller Co., The, Kirby Bldg., Cleveland, O.
Superior Basic Brick Co., 517 Bessemer Bldg., Pittsburgh, Pa.
Union Mining Co., 1113 Fidelity Bldg., Baltimore, Md.

REINFORCEMENTS (Steel)
Truscon Steel Co., 250 Lafayette Blvd., Detroit, Mich.

RHEOSTATS
Electric Controller & Mfg. Co., Cleve'd, O.

RIVETERS (Pneumatic)
Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, O.

RIVETING MACHINERY
Chambersburg Engineering Co., Chambersburg, Pa.
Shuster, The, F. B., Co., New Haven, Conn.

RIVET HEATER (Electric)
American Car & Foundry Co., 165 Broadway, New York, N. Y.
General Electric Co., Schenectady, N. Y.

RIVET SETS
Hunter Saw & Machine Co., 57th and Butler Sts., Pittsburgh, Pa.

RIVETS
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Company, Hanna Bldg., Cleveland, Ohio.
Champion Rivet Co., The, E. 108th St. & Harvard Ave., Cleveland, O.
Illinois Steel Co., Warehouse Dept., Chicago, Ill.
Progressive Mfg. Co., Torrington, Conn.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

ROD MILLS
Morgan Construction Co., Worcester, Mass.
Treadwell Engineering Co., Easton, Pa.
Vaughn Machinery Co., The, Cuyahoga Falls, O.

RODS (Drill)
Kidd Drawn Steel Co., Aliquippa, Pa.
National Drawn Steel Co., E. Liverpool, O.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.

RODS (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.

RODS (Welding)—See WELDING RODS

ROLLING DOORS AND SHUTTERS
Kinnear Manufacturing Co., 818-868 Field Ave., Columbus, O.

ROLLING MILL BEARINGS
Hyatt Roller Bearing Co., Newark, N. J.

ROLLING MILL EQUIPMENT
Alliance Machine Co., Alliance, Ohio.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Hubbard Steel Foundry Co., East Chicago, Ind.
Hyde Park Fdry. & Mch. Co., Hyde Park, Pa.
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Mesta Machine Co., Homestead, Pa.
Morgan Construction Co., Worcester, Mass.
National Roll & Foundry Co., Avonmore, Pa.
Standard Engineering Co., Ellwood City, Pa.
Sutton-Abramson Engrg. Co., Pittsburgh, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engineering & Foundry Co., Pittsburgh, Pa.
Wellman-Seaver-Morgan Co., 7000 Central Ave., Cleveland, O.
Wheeling Mold & Foundry Co., Wheeling, W. Va.
Youngstown Foundry & Machine Co., Youngstown, Ohio.

ROLLING MILL MACHINERY
Kane & Roach, Niagara and Shonnard Sts., Syracuse, N. Y.

ROLLING MILLS (Consulting Engineers)
Morgan Construction Co., Worcester, Mass.
Treadwell Engineering Co., Easton, Pa.

ROLLING MILLS (Contracting Engineers)
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.

ROLLS
American Adamite Co., The, 314 Oliver Bldg., Pittsburgh, Pa.
Hubbard Steel Foundry Co., East Chicago, Ind.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Mesta Machine Co., Homestead, Pa.
Pittsburgh Rolls Corp., Pittsburgh, Pa.
Pollak Steel Co., The, Cincinnati, O.
Standard Engrg. Co., Ellwood City, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.
Youngstown Fdry. & Mach. Co., Youngstown, Ohio.

ROLLS (Bending and Straightening)
Pollak Steel Co., The, Cincinnati, O.

ROLLS (Hardened Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Pittsburgh Rolls Corp., 41st St. and A. V. Ry., Pittsburgh, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

ROLLS (Sand Chilled and Steel)
Birdsboro Steel Foundry & Mach. Co., Birdsboro, Pa.
Duquesne Steel Foundry Co., Pittsburgh, Pa.
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.
Mackintosh-Hemphill Co., 12th and Etna Sts., Pittsburgh, Pa.
National Roll & Foundry Co., Avonmore, Pa.
Pittsburgh Rolls Corp., 41st St. and A. V. Ry., Pittsburgh, Pa.
United Engineering & Foundry Co., Pittsburgh, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

ROLLS (Special)
Pittsburgh Rolls Corp., 41st St. and A. V. Ry., Pittsburgh, Pa.

ROLLS (Wood)
Dart, E. M., Mfg. Co., Providence, R. I.

ROOFING AND SIDING (Composite)
Brier Hill Steel Co., Youngstown, O.

ROOFING AND SIDING (Iron and Steel)
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Newport Rolling Mills Co., Newport, Ky.

SAFE ENDS (Boiler Tube)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

SAFETY DEVICES (Electric)
Electric Controller & Mfg. Co., Cleveland, O.

SAFETY STEPS AND TREADS
Irving Iron Works Co., Long Island, N. Y.

SAND
Portage Silica Co., The, 602 Stambaugh Bldg., Youngstown, O.
United States Silica Co., 122 South Michigan Ave., Chicago, Ill.

SAND (Sand Blast)
Portage Silica Co., The, 602 Stambaugh Bldg., Youngstown, O.
United States Silica Co., 122 South Michigan Ave., Chicago, Ill.

SAND BLAST ABRASIVES (Shot Grit)
Pittsburgh Crushed Steel Co., 61st & A. V. R. R., Pittsburgh, Pa.

SAND BLAST EQUIPMENT AND ACCESSORIES
American Foundry Equipment Co., Madison Ave. & 46th St., New York City
Hœvel Mfg. Corp., 152 Ogden Ave., Jersey City, N. J.
Pangborn Corporation, P. O. Box 858, Hagerstown, Md.

SAND CONVEYING AND HANDLING MACHINERY
Bartlett & Snow, C. O., Co., Cleveland, O.
Link-Belt Co., Chicago, Ill.
National Engineering Co., Machinery Hall Bldg., 549 W. Washington Blvd., Chicago, Ill.
Standard Sand & Machine Co., Cleveland, O.

SAND MIXERS, CUTTERS AND SIFTERS
American Foundry Equipment Co., Madison Ave. & 46th St., New York City
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Standard Sand & Machine Co., Cleveland, O.

SAND MIXERS (Core and Facing Sand)
Standard Sand & Machine Co., 5151 St. Clair Ave., Cleveland, O.

SAND RAMMERS
Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.

SAND RECLAIMERS
Hadfield-Penfield Steel Co., The, Bucyrus, O.

SASH PAINT
Skybryte Co., The, Bangor Bldg., Cleveland, Ohio.

SASH (Steel Casement)
Truscon Steel Co., 250 Lafayette Blvd., Detroit, Mich.

SAWS (Cold and Hot Metal)
Hunter Saw & Machine Co., 57th and Butler Sts., Pittsburgh, Pa.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Racine Tool & Machine Co., Racine, Wis.
Simmons Machine Co., Inc., Albany, N. Y.
United Engineering & Foundry Co., Pittsburgh, Pa.

SCRAP BALING PRESSES
Logemann Bros. Co., 3120 Burleigh Ave., Milwaukee, Wis.

SCRAP BUNDLING MACHINES (Wire Mills)
Vaughn Machinery Co., The, Cuyahoga Falls, O.

SCREENS AND SIEVES
Erdle Perforating Co., Rochester, N. Y.
Hendricks Mfg. Co., The, Carbondale, Pa.

SCREW MACHINE PRODUCTS
Cincinnati Screw Co., Dept. R, Loveland, Ohio.
Link-Belt Co., Chicago, Ill.

SCREW STOCK (Cold Drawn)
Lancaster Steel Products Corp., Lancaster, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Pardee Steel Corp., Perth Amboy, N. J.
Standard Gauge Steel Co., Beaver Falls, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.

SCREW STOCK (Free Cutting)
National Drawn Steel Co., E. Liverpool, O.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SCREWS
Clark Bros. Bolt Co., Milldale, Conn.
Progressive Mfg. Co., Torrington, Conn.

SEAMLESS STEEL TUBING—See TUBES (Cold Drawn Seamless Steel)

SET SCREWS (Safety)
Bristol Co., The, Waterbury, Conn.

SHAFT AND PIPE STRAIGHTENERS (Hydraulic)
Logemann Brothers Co., 3120 Burleigh Ave., Milwaukee, Wis.

SHAFT HANGERS
Hyatt Roller Bearing Co., Newark, N. J.

SHAFTING
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pollak Steel Co., The, Cincinnati, O.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Standard Gauge Steel Co., Beaver Falls, Pa.
Vanadium Corp. of America, Equitable Bldg., New York
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAFTING (Cold Drawn and Turned)
Bethlehem Steel Co., Bethlehem, Pa.
National Drawn Steel Co., East Liverpool, O.
Pardee Steel Corp., Perth Amboy, N. J.
Union Drawn Steel Co., Beaver Falls, Pa.
Wyckoff Drawn Steel Co., P. O. Box 54, Pittsburgh, Pa.

SHAPERS—See PLANERS AND SHAPERS

SHAPES (Round, Square, Hexagon)
Union Drawn Steel Co., Beaver Falls, Pa.

SHAPES (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carngie Bldg., Pittsburgh, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Pollak Steel Co., The, Cincinnati, O.
Republic Iron & Steel Co., Youngstown, O.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPES (Wire)
American Spiral Spring & Mfg. Co., 5500 Butler St., Pittsburgh, Pa.

SHEAR BLADES AND KNIVES
Cleveland Knife & Forge Co., 1960 West 114th St., Cleveland, O
Heppenstall Forge & Knife Co, Pittsburgh, Pa.
Pittsburgh Knife & Forge Co., Pittsburgh, Pa.

SHEARS
Bliss, E. W., Co., 8 Adams St., Brooklyn, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., West 12th St., Erie, Pa.
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
National Roll & Foundry Co., Avonmore, Pa.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Streine Tool & Mfg. Co., The, New Bremen, Ohio.
Toledo Machine & Tool Co., Toledo, Ohio.
United Engrg. & Fdry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Yoder Co., The, 5510 Walworth St., Cleveland, O.

SHEARS (Alligator)
Canton Foundry & Machine Co., The, Canton, Ohio.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

CASTINGS

MALLEABLE IRON CASTINGS

Annual Capacity 50,000 Tons

The
T. H. SYMINGTON
Company

Rochester, New York

LAKESIDE
MALLEABLE CASTINGS
COMPANY

Racine, Wisconsin
Chicago Office—38 S. Dearborn St.

Moline Malleable Iron Company
DETACHABLE DRIVE-CHAIN
St. Charles, Ill.
CERTIFIED Malleable Castings

DECATUR
Malleable Iron Castings
Certified
DECATUR MALLEABLE IRON COMPANY
DECATUR ILLINOIS

LINK-BELT
MALLEABLE IRON CASTINGS
We specialize in the manufacture of small, accurate, "certified" malleable castings, of the same high quality as maintained for Link-Belt Chains.
LINK-BELT COMPANY
INDIANAPOLIS P. O. Box 346 INDIANA

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PEORIA MALLEABLE CASTINGS COMPANY
The Factory of Service
High Grade Malleables
of all descriptions
MODERN EQUIPMENT PEORIA, ILL., U. S. A. LARGE CAPACITY

Kalamazoo Malleable Iron Co.
GUARANTEED QUALITY MADE FOR YOU IN
KALAMAZOO

DANVILLE
CERTIFIED MALLEABLE CASTINGS
"The MARK of QUALITY"
DANVILLE MALLEABLE IRON CO.
DANVILLE, ILL.

The Marion Malleable Iron Works
MARION, INDIANA
We Make
Specify Them
Manufacturers of
CERTIFIED MALLEABLE CASTINGS
FOR GENERAL PURPOSES

SHEET BARS
Andrews Steel Co., Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
Lockart Iron & Steel Co., Pittsburgh, Pa.
Mansfield Sheet & Tin Plate Co., The, Mansfield, Ohio.
Wheeling Steel Corp., Wheeling, W. Va.

SHEET METAL STRAIGHTENERS
Shuster, The, F. B, Co., New Haven, Conn.

SHEET METAL WORK
Crosby Co., 183 Pratt St., Buffalo, N. Y.

SHEET METAL WORKING MACHINERY
Ams, Max, Machine Co., 101 Park Ave., New York, N. Y.
Bliss, E. W., Co., 8 Adams St., Brooklyn, N. Y.
Streine Tool & Mfg. Co., The, New Bremen, Ohio
Toledo Machine & Tool Co., Toledo, Ohio.
Yoder Co., The, 5510 Walworth St., Cleveland, O.

SHEETS
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Apollo Steel Co., Apollo, Pa.
Bethlehem Steel Co, Bethlehem, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Central Steel Co., Massillon, Ohio.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Mansfield Sheet & Tin Plate Co., The, Mansfield, Ohio.
Morris & Bailey Steel Division, Oliver Iron & Steel Corp., Wilson Station, Pittsburgh, Pa.
Newport Rolling Mills Co, Newport, Ky.
Otis Steel Co., Cleveland, O.
Phillips, F. R., & Sons Co., Pennsylvania Bldg., Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Seneca Iron & Steel Co., Buffalo, N. Y.
Trumbull Steel Co., The, Warren, Ohio.

SHEETS (Automobile)
Allegheny Steel Co, Brackenridge, Pa.
Central Steel Co., Massillon, Ohio.
Mansfield Sheet & Tin Plate Co., The, Mansfield, Ohio.
Otis Steel Co., Cleveland, O.
Seneca Iron & Steel Co., Erie County Bank Bldg., Buffalo, N. Y.
Wheeling Steel Corp., Wheeling, W. Va.

SHEETS (Black)
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Co., Hanna Bldg., Cleveland, O.
Mansfield Sheet & Tin Plate Co., The, Mansfield, Ohio.
Newport Rolling Mill Co, Newport, Ky.
Republic Iron & Steel Co., Youngstown, O.
Seneca Iron & Steel Co., Buffalo, N. Y.
Standard Tin Plate Co., Canonsburg, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Blue Annealed)
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Apollo Steel Co., Apollo, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Co., Hanna Bldg., Cleveland, O.
Central Steel Co., Massillon, Ohio.
Mansfield Sheet & Tin Plate Co, The, Mansfield, O.
Republic Iron & Steel Co., Youngstown, O.
Tennessee Coal, Iron & Railroad Co., 1351 Brown-Marx Bldg., Birmingham, Ala.
Trumbull Steel Co., The, Warren, Ohio.
Wheeling Steel Corp., Wheeling, W. Va.
Wood, Alan, Iron & Steel Co, Philadelphia, Pa.

SHEETS (Copper)
Copper & Brass Research Association, 25 Broadway, New York City, N. Y.

SHEETS (Corrugated)
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

SHEETS (Dead Soft)
American Rolling Mill Co, Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.

SHEETS (Electrical)
Allegheny Steel Co., Pittsburgh, Pa.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Central Steel Co., Massillon, Ohio.
Mansfield Sheet & Tin Plate Co., The, Mansfield, Ohio.
Trumbull Steel Co., The, Warren, Ohio.
Wheeling Steel Corp., Wheeling, W. Va.

SHEETS (Galvanized)
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Morris, Wheeler & Co., 30th & Locust Streets, Philadelphia, Pa.
Newport Rolling Mill Co., Newport, Ky
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Trumbull Steel Co., Warren, Ohio.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Heat and Acid Resisting)
Cutler Steel Co., Bowman Bldg., Pittsburgh, Pa.

SHEET MILLS
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.

SHEETS (Perforated)
Erdle Perforating Co., Rochester, N. Y.

SHEETS (Roofing)—See ROOFING AND SIDING

SHEETS (Tin)—See TIN PLATE

SHIPBUILDING SHAPES
Bethlehem Steel Co., Bethlehem, Pa.

SLABS
Andrews Steel Co., Newport, Ky.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Mansfield Sheet & Tin Plate Co., The, Mansfield, Ohio.
Wheeling Steel Corp., Wheeling, W. Va.

SPACING TABLES
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

SPEED REDUCERS
Jones, W. A., Foundry & Machine Co., 4437 Roosevelt St., Chicago, Ill.

SPIEGELEISEN
Leavitt, C. W., & Co., 30 Church St., New York, N. Y.
New Jersey Zinc Co., The, Maiden Lane & Front St., New York, N. Y.
Rogers, Brown & Co., Cincinnati, O.
Frank, Samuel, & Co., Harrison Bldg., Philadelphia, Pa.

SPIKES
Bethlehem Steel Co., Bethlehem, Pa.
Illinois Steel Co., Chicago, Ill.

SPRINGS
American Spiral Spring & Mfg. Co., 5500 Butler St., Pittsburgh, Pa.
Cook Spring Co., Ann Arbor, Mich.
Duer Spring & Mfg. Co., Pittsburgh, Pa.
Gibson, Wm., D., Co., 1800 Clybourn Ave., Chicago, Ill.
Raymond Mfg. Co., Center St., Cory, Pa.
Vanadium Corp. of America, Equitable Bldg., New York, N. Y.
Wickwire Spencer Steel Corp., 11 E. 42nd St., New York, N. Y.

SPRINGS (Coil and Flat)
Cook Spring Co., Ann Arbor, Mich.
Gibson, Wm. D., Co., 1800 Clybourn Ave., Chicago, Ill.

SPRING COILING MACHINERY
Sleeper & Hartley, Inc., 335 Chandler St., Worcester, Mass.

SPRUE CUTTERS
The F. B. Shuster Co., New Haven, Conn.

STACKS (Steel)
Heltzel Steel Form & Iron Co., The, Warren, Ohio.
Hendrick Manufacturing Co., Carbondale, Pa.
Petroleum Iron Works Co. of Ohio, Sharon, Pa.
Sotter Bros., Inc., Pottstown, Pa.

STAIR STEPS AND TREADS (Nonslipping)
Irving Iron Works Co., Long Island City, N. Y.

STAMPINGS
Allegheny Steel Co., Brackenridge, Pa.
Bettcher Stamping & Mfg. Co., 3106 W. 61st St., Cleveland, O.
Bliss, E. W., Co., 8 Adams St., Brooklyn, N. Y.
Budd, E. G., Mfg. Co., Specialty Dept., Philadelphia, Pa.
Cleveland Metal Products Co., 1135 Ivanhoe Road, Cleveland, Ohio.
Crosby Co., 183 Pratt St., Buffalo, N. Y.
Lindsay Chaplet & Mfg. Co., Harrison Bldg., Philadelphia, Pa.
Niles Steel Products Co., The, Niles, Ohio.
Truscon Steel Co., 250 Lafayette Blvd., Detroit, Mich.

STAMPS (Steel)
Matthews, James H., & Co., 2016 Forbes Field, Pittsburgh, Pa.
Pannier Bros. Stamp Co., 210 Sandusky St., Pittsburgh, Pa.

STARTERS (Electric Motor)
Electric Controller & Mfg. Co., Cleveland.

STEAM SPECIALTIES
Crane Co., The, 836 S. Michigan Ave., Chicago, Ill.

STEEL
Andrews Steel Co., Newport, Ky.
Atlas Steel Corp., Dunkirk, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Central Steel Co., The, Massillon, Ohio.
Hickman, William, & Co., 1343 Oliver Bldg., Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago, Ill.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
Kidd Drawn Steel Co., Aliquippa, Pa.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Lukens Steel Co., Coatesville, Pa.
Morris, Wheeler & Co., 30th and Locust St., Philadelphia, Pa.
Pacific Coast Steel Co., San Francisco, Cal.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Superior Steel Corp., Union Arcade, Pittsburgh, Pa.
West Leechburg Steel Co., Pittsburgh, Pa.
Wickwire Spencer Steel Corp., 41 E. 42nd St., New York, N. Y.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL (Agricultural)
Bethlehem Steel Co., Bethlehem, Pa.
Pollak Steel Co., The, Cincinnati, O.

STEEL (Alloy)
Andrews Steel Co., Newport, Ky.
Atlas Steel Corp., Dunkirk, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Co., Hanna Bldg., Cleveland, O.
Central Steel Co., The, Massillon, Ohio.
Donner Steel Co., Inc., P. O. Box 1000,, Buffalo, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
Lancaster Steel Products Corp., Lancaster, Pa.
McConway & Torley Co., Arsenal Station, Pittsburgh, Pa.
National Drawn Steel Co., E. Liverpool, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Vanadium Corp. of America, Equitable Bldg., New York, N. Y.

STEEL (Bessemer Screw Stock)
Bethlehem Steel Co., Bethlehem, Pa.

STEEL (Carbon)
Bethlehem Steel Co., Bethlehem, Pa.

STEEL (Cold Drawn)
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Kidd Drawn Steel Co., Aliquippa, Pa.
Lancaster Steel Products Corp., Lancaster, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
National Drawn Steel Co., E. Liverpool, O.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Standard Gauge Steel Co., Beaver Falls, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL (Crucible)
Atlas Steel Corp., Dunkirk, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Company, Hanna Bldg., Cleveland, Ohio.
Firth-Sterling Steel Co., McKeesport, Pa.
Pittsburgh Cold Rolled Steel Co., Verona, Pa.

STEEL (Electric Furnace)
Bethlehem Steel Co., Bethlehem, Pa.

STEEL DOORS AND SHUTTERS
Kinnear Manufacturing Co., 818-868 Field Ave., Columbus, O.

STEEL FABRICATORS—See BRIDGES, BUILDINGS, VIADUCTS (Steel)

STEEL (High Speed)
Atlas Steel Corp., Dunkirk, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Company, Hanna Bldg., Cleveland, Ohio.
Firth-Sterling Steel Co., McKeesport, Pa.
Vanadium Alloys Steel Co., Latrobe, Pa.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

CASTINGS

PITTSBURGH MALLEABLE IRON CO.
MALLEABLE CASTINGS
Pittsburgh, Penna.

ZANESVILLE MALLEABLE CO.
MALLEABLE CASTINGS
ZANESVILLE, OHIO

Dayton Malleable Iron Co.
Dayton, Ohio

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NORTHERN MALLEABLE IRON CO.
ST. PAUL, MINN.

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VERMILION MALLEABLE IRON CO.
641 RAILWAY EXCHANGE BLDG. CHICAGO
200 NO. SIXTH AVE. HOOPESTON, ILLINOIS

WANNER
Malleable Castings Co.
HAMMOND, IND. SO. BELOIT, ILL.
Capacity, 30,000 tons CERTIFIED Castings per annum

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TO WITHSTAND BRAZING AT HIGH TEMPERATURE
FOR HOT GALVANIZING
AVERAGE TENSILE STRENGTH 55,000 LBS. PER SQUARE INCH
ARCADE MALLEABLE IRON CO.
Albany and Muskegon Sts., Worcester, Mass. Established 1850

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760 CURTIS AVE., COLUMBUS, OHIO

MALLEABLE IRON CASTINGS
ACME STEEL & MALLEABLE IRON WORKS, INC. BUFFALO, N. Y.
GRAY IRON CASTINGS
Quality and Deliveries Guaranteed

MALLEABLE IRON CASTINGS
NEWARK MALLEABLE IRON WORKS
QUALITY NEWARK, N.J. SERVICE

STEEL (Open Hearth)
Bethlehem Steel Co., Bethlehem, Pa.
Central Steel Co., Massillon, Ohio.
Gulf States Steel Co.,
Brown-Marx Bldg., Birmingham, Ala.
Harrisburg Pipe & Pipe Bending Co.,
Harrisburg, Pa.
McConway & Torley Co.,
Arsenal Station, Pittsburgh, Pa.
Pardee Steel Corp., Perth Amboy, N. J.

STEEL (Open-hearth—Cold Drawn)
Bethlehem Steel Co., Bethlehem, Pa.
Lancaster Steel Products Corp.,
Lancaster, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.

STEEL (Soft)
Bethlehem Steel Co., Bethlehem, Pa.

STEEL (Spring)
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Company,
Hanna Bldg., Cleveland, Ohio.
Central Steel Co., Massillon, Ohio.
Donner Steel Co., Inc.,
P. O. Box 1000, Buffalo, N. Y.

STEEL (Stainless)
Bethlehem Steel Co., Bethlehem, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.

STEEL (Stamping and Drawing)
American Tube & Stamping Co., The,
Hancock St., Bridgeport, Conn.
Columbia Steel Co., Elyria, Ohio.
Greer Steel Co., Dover, Ohio.
Griffin Mfg. Co., The,
15th and Cherry Sts., Erie, Pa.

STEEL (Strip, Hot and Cold Rolled)
Acme Steel Goods Co.,
2840 Archer Ave., Chicago, Ill.
American Steel Co.,
Park Bldg., Pittsburgh, Pa.
Central Steel Co., Massillon, Ohio.
Columbia Steel Co., The, Elyria, O.
Greer Steel Co., Dover, Ohio.
Griffin Mfg. Co., Erie, Pa.
Laclede Steel Co.,
Arcade Bldg., St. Louis, Mo.
Lancaster Steel Products Corp.,
Lancaster, Pa.
Morris & Bailey Steel Division, Oliver Iron & Steel Corp.,
Wilson Station, Pittsburgh, Pa.
Pittsburgh Cold Rolled Steel Co.,
Verona, Pa.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Superior Steel Corp.,
Union Arcade, Pittsburgh, Pa.
Trumbull Steel Co., The, Warren, Ohio.
West Leechburg Steel Co., Pittsburgh, Pa.

STEEL (Structural)
Alliance Structural Co., Alliance, Ohio.
American Bridge Co.,
71 Broadway, New York, N. Y.
Belmont Iron Works, Philadelphia, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Co.,
602 Farmers Bank Bldg., Pittsburgh, Pa.
Bourne-Fuller Company,
Hanna Bldg., Cleveland, Ohio.
Eichleay, John Jr., Co.,
So. 20th and Wharton, Pittsburgh, Pa.
Erie Steel Construction Co., The, Erie, Pa.
Illinois Steel Warehouse Co.,
208 So. La Salle St., Chicago, Ill.
Kratzer, W. N., Co.,
3212 Smallman St., Pittsburgh, Pa.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
McClintic-Marshall Co.,
Oliver Bldg., Pittsburgh, Pa.
Ohio Structural Steel Co., The,
Newton Falls, Ohio.
Phillips, F. R., & Sons Co.,
Pennsylvania Bldg., Philadelphia, Pa.
Phoenix Iron Co.,
20 S. 15th St., Philadelphia, Pa.
Pittsburgh-Des Moines Steel Co.,
Curry Bldg., Pittsburgh, Pa.
Pollak Steel Co., The, Cincinnati, Ohio.
Ryerson, Joseph T., & Son, Inc.,
16th and Rockwell Sts., Chicago, Ill.
Snead Architectural Iron Works,
Louisville, Ky.
Tenn. Coal, Iron & R. R., Co.,
Birmingham, Ala.
Truscon Steel Co.,
250 Lafayette Blvd., Detroit, Mich.

STEEL (Tool)
Atlas Steel Corp., Dunkirk, N. Y.
Bethlehem Steel Corp., Bethlehem, Pa.
Bourne-Fuller Company,
Hanna Bldg., Cleveland, Ohio.
Firth-Sterling Steel Co. McKeesport Pa.
Kidd Drawn Steel Co., Aliquippa, Pa.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Vanadium Alloys Steel Co., Latrobe, Pa.

STEEL BELT LACING
Flexible Steel Lacing Co.,
4607 Lexington St., Chicago, Ill.

STEEL BUILDINGS — See BRIDGES, BUILDINGS AND VIADUCTS

STEEL PLANTS (Contracting Engineers)
McKee, Arthur G., & Co.,
2422 Euclid Ave., Cleveland, O.

STEEL PLATE CONSTRUCTION
Blaw-Knox Co.,
602 Farmers Bank Bldg., Pittsburgh, Pa.
Erie City Iron Works,
East Ave., & R. R., Erie, Pa.
Hammond Iron Works, Warren, Pa.
Heltzel Steel Form & Iron Co., The,
Warren, Ohio.
Hendrick Manufacturing Co.,
Carbondale, Pa.
Pennsylvania Engrg. Works,
New Castle, Pa.
Petroleum Iron Works Co. of Ohio,
Sharon, Pa.
Pittsburgh-Des Moines Steel Co.,
Curry Bldg., Pittsburgh, Pa.
Riter-Conley Co., Oliver Bldg., Pittsburgh
Sotter Bros., Inc., Pottstown, Pa.
Steel Plate Products Co., Pottstown, Pa.

STEEL PLATES—See PLATES (Iron and Steel)

STEEL STAMPINGS—See STAMPINGS

STEEL TUBING
Calorizing Co., The,
Oliver Bldg., Pittsburgh, Pa.
Detroit Seamless Steel Tubes Co.
Grand River Station, Detroit, Mich.

STEEL TUBING (Cold Drawn)
National Tube Co.,
Frick Bldg., Pittsburgh, Pa.
Babcock & Wilcox Tube Co.,
85 Liberty St., N. Y. C.

STEPS (Ladder and Stair, Nonslipping)
Irving Iron Works Co,
Long Island City, N. Y.

STOKERS
Babcock & Wilcox Co., The, N. Y. C.
Hagan, Geo. J., Co.,
Chamber of Commerce Bldg.,
Pittsburgh, Pa.

STOOLS AND FACTORY EQUIPMENT (Steel)
Angle Steel Stool Co., Plainwell, Mich.

STRAIGHTENING MACHINERY
Shuster, The F. B., Co., New Haven, Conn.
Sutton-Abramsen Engrg. Co., Pittsburgh, Pa.

STRIP MILLS (Hot or Cold)
Treadwell Engineering Co., Easton, Pa.

STRIP STEEL STRAIGHTENERS
Shuster, The F. B., & Co., New Haven, Conn.

STRUCTURAL IRON AND STEEL—See STEEL (Structural)

SUBWAY GRATING
Irving Iron Works Co.,
Long Island City, N. Y.

SULPHURIC ACID
Cleveland-Cliffs Iron Co., Cleveland, O.

SUPPLIES (Oxy-Acetylene Process)
Air Reduction Sales Co.,
342 Madison Ave., New York, N. Y.
Oxweld Acetylene Co.,
646 Frelinghuysen St., Newark, N. J.

SWITCHES (Electric)
Electric Controller & Mfg. Co., Cleveland.

SWITCH STANDS
Bethlehem Steel Co., Bethlehem, Pa.

TAGS (Metal Shipping)
Pannier Bros. Stamp Co.,
210 Sandusky St., Pittsburgh, Pa.

TANKS (Acid)
Hauser-Stander Tank Co.,
Ammen & B. & O. R. R., Cincinnati, O.

TANKS (Air, Gas, Gasoline, Oil and Water)
Blaw-Knox Co.,
602 Farmers Bank Bldg., Pittsburgh, Pa.

TANKS (Acetylene)
National Tube Co.,
Frick Bldg., Pittsburgh, Pa.

TANKS (Storage, Pressure, Riveted, Welded)
Air Tight Steel Tank Co., Pittsburgh, Pa.
Blaw-Knox Co.,
602 Farmers Bank Bldg., Pittsburgh, Pa.
Erie City Iron Works, Erie, Pa.
Hammond Iron Works, Warren, Pa.
Petroleum Iron Works Co., Sharon, Pa.
Pittsburgh-Des Moines Steel Co.,
Curry Bldg., Pittsburgh, Pa.
Riter-Conley Co., Oliver Bldg., Pittsburgh.
Sotter Bros. Inc., Pottstown, Pa.
Steel Plate Products Co., Pottstown, Pa.

TANKS (Wooden, Acid and Pickling)
Bailey, Wm. M., Co.,
506 Bakewell Bldg., Pittsburgh, Pa.
Hauser-Stander Tank Co., The,
Ammen & B. & O. R. R., Cincinnati, O.

TAPER PINS
Standard Gauge Steel Co., Beaver Falls, Pa.

TAPPING MACHINES
Taylor-Wilson Mfg. Co.,
Thomson Ave., McKees Rocks, Pa.

TESTING MACHINES (Pipe)
Taylor-Wilson Mfg. Co.,
Thomson Ave., McKees Rocks, Pa.

THERMOMETERS (Recording)
Bristol Co., The, Waterbury, Conn.

THREAD CUTTING TOOLS
Landis Machine Co., Waynesboro, Pa.

TIE PLATES
Bethlehem Steel Co., Bethlehem, Pa.
Illinois Steel Co.,
208 S. LaSalle St., Chicago, Ill.

TIN PLATE
American Rolling Mills Co., Middletown, O.
American Sheet & Tin Plate Co.,
Pittsburgh, Pa.
American Steel Co., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Mansfield Sheet & Tin Plate Co.,
Mansfield, Ohio.
Standard Tin Plate Co., Canonsburg, Pa.
Taylor, N. & G., Co., Inc.
300 Chestnut St., Philadelphia, Pa.
Trumbull Steel Co., Warren, Ohio.

TIN PLATE MILL EQUIPMENT
Birdsboro Steel Fdy. & Machine Co.,
Birdsboro, Pa.
Lewis Foundry & Machine Co.,
Farmers Bank Bldg., Pittsburgh, Pa.

TITANIUM
Titanium Alloy Mfg. Co.,
Niagara Falls, N. Y.

TOOL BITS (High Speed)
Firth-Sterling Steel Co., McKeesport, Pa.

TOOL HOLDERS BITS (Treated)
Bethlehem Steel Co., Bethlehem, Pa.

TOOL HOLDERS
Williams, J. H., & Co.,
58 Richards St., Brooklyn, N. Y.

TOOLS
Cleveland Pneumatic Tool Co.,
3734 E. 78th St., Cleveland, O.
Ingersoll-Rand Co.,
11 Broadway, New York City

TOOLS (Hand)
Warren Tool & Forge Co.,
225 Griswold St., Warren, Ohio

TOOLS (Pneumatic)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York

TOOLS (Portable Electric)
Chicago Pneumatic Tool Co.,
6 East 44th St., New York

TORCHES AND BURNERS (Acetylene, Blow, Oxy-Acetylene)
Air Reduction Sales Co.,
342 Madison Ave., New York, N. Y.
Oxweld Acetylene Co., Newark, N. J.

TOWERS (Transmission)
American Bridge Co.,
71 Broadway, New York, N. Y.
Blaw-Knox Co.,
602 Farmers Bank Bldg., Pittsburgh, Pa.

TRANSMISSION MACHINERY
Jones, W. A., Foundry & Machine Co.,
4437 W. Roosevelt St., Chicago, Ill.

TREADS (Nonslipping)
Irving Iron Works Co.,
Long Island City, N. Y.

TROLLEYS
Armington Eng. Co., The, Euclid, Ohio.
Cleveland Crane & Eng. Co., Wickliffe, O.
Euclid Crane & Hoist Co.,
Dept. B., Euclid, Ohio.
Milwaukee Electric Crane & Mfg. Co.,
Milwaukee, Wis.
Shepard Electric Crane & Hoist Co.,
358 Schuyler Ave., Montour Falls, N. Y.

TRUCKS AND TRACTORS (Industrial)
Atlas Car & Mfg. Co.,
Dept. E, Cleveland, O.

TUBE MILL MACHINERY
Standard Eng. Co., Ellwood City, Pa.
United Engineering & Foundry Co.,
Farmers Bank Bldg., Pittsburgh, Pa.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

Malleable Iron *Gray Iron*

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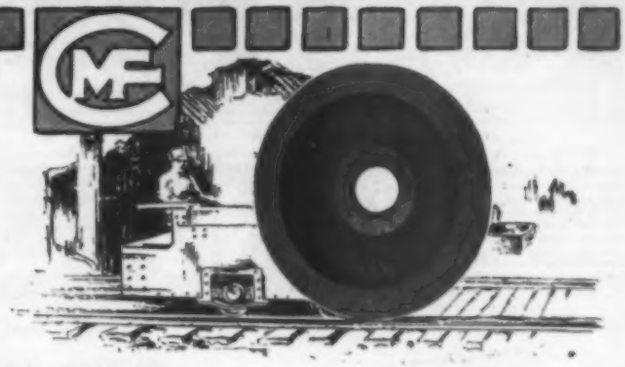

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3695 East 78th St., Cleveland, Ohio
New York Office—30 Church St.
Philadelphia Office—Bourse Bldg.
Detroit Office—705 Ford Bldg.

DROP FORGINGS

TUBES
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.
Detroit Seamless Steel Tubes Co., Grand River Station, Detroit, Mich.
Johnson-Peter Co., Warehouse No. 3, Bush Terminal, Brooklyn, N. Y.
National Tube Co. Frick Bldg., Pittsburgh, Pa.
Babcock & Wilcox Tube Co., 85 Liberty St., N. Y. C.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Williams & Co., Inc., 901-937 Pennsylvania Ave., Pittsburgh, Pa.

TUBES (Cold Drawn Seamless Steel)
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Detroit Seamless Steel Tubes Co., Grand River Station, Detroit, Mich.
Babcock & Wilcox Tube Co., 85 Liberty St., N. Y. C.

TUBES (Lap Welded Boiler)
Allegheny Steel Co., Pittsburgh, Pa.
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.

TUBING (Seamless Steel and Lap-Welded)
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.
Keating, E. F., Co., 446-54 Water St, New York, N. Y.
National Tube Co., Frick Bldg., Pittsburgh, Pa.

TURBINES (Steam)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schnectady, N. Y.

TURBO BLOWERS—See BLOWERS

TURNBUCKLES
Merrill Brothers, Maspeth, N. Y.

TURNTABLES (Industrial and Auto)
Canton Foundry & Machine Co., The, Canton, Ohio.

TUYERES
Keystone Bronze Co., 39th St., Pittsburgh, Pa.

TWIST DRILLS—See DRILLS (Twist)

UNIONS (Pipe)
Dart, E. M., Co., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.

USED AND REBUILT EQUIPMENT
See Page 91.

VALVES
Crane Co., The, 836 S. Michigan Ave., Chicago, Ill.

VALVES (Gas and Air Reversing)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
McKee, Willis, 2422 Euclid Ave., Cleveland, O.
Morgan Construction Co., Worcester, Mass.

VALVES (Gate-Brass, Iron, Steel)
Crane Co., The, 836 S. Michigan Ave., Chicago, Ill.

VALVES (Pneumatic)
Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, O.

VALVES (Water Cooled)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.

VALVES AND FITTINGS
American Foundry & Construction Co., 4700 2nd Ave., Pittsburgh, Pa.
Chambersburg Engineering Co., Chambersburg, Pa.
Crane Co., The, 836 S. Michigan Ave., Chicago, Ill.
Jenkins Brothers, 80 White St., New York, N. Y.
Pittsburgh Valve, Fdy. & Construction Co., 26th & A. V. R. R., Pittsburgh, Pa.
Powell, Wm., Co., 1200 Draper St., Cincinnati, O.

VANADIUM
Vanadium Corp. of America. Equitable Bldg., New York, N. Y.

VIADUCTS (Steel)—See BRIDGES, BUILDINGS AND VIADUCTS

VISES
Williams, J. H., & Co., 58 Richards St., Brooklyn, N. Y.

WAREHOUSES (Iron and Steel)
Illinois Steel, Warehouse Dept., 208 S. La Salle St., Chicago, Ill.
McCalla, Harold, Co., The, Pier 56, North Wharves, Delaware River, Philadelphia, Pa.
Morris, Wheeler & Co., 30th and Locust Sts., Philadelphia, Pa.

WASHERS
Oliver Iron & Steel Corp., So. 10th & Muriel Sts., Pittsburgh, Pa.

WASHERS (Brass and Bronze)
Everitt Co., The, 271 Franklin St., Boston, Mass.

WASHERS (Iron and Steel)
Allegheny Steel Co., Brackenridge, Pa.
Bethlehem Steel Co., Bethlehem, Pa.

WASHERS (Leather)
Chicago Rawhide Mfg. Co., 1301 Elston Ave., Chicago, Ill.

WASHING MATERIAL (Rags)
Ford, J. B., Co., The, Wyandotte, Mich.

WEDGES (Journal Bearing—R. R.)
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Transue & Williams Steel Forging Corp., Alliance, Ohio.

WELDED HEADERS
American Foundry & Construction Co., 4700 2nd Ave., Pittsburgh, Pa.

WELDING (Forge and Hammer)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.

WELDING (Plastic-Arc)
Wilson Welder & Metals Co., 132 King St., New York, N. Y.

WELDING AND CUTTING APPARATUS (Electric)
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General Electric Co., Schenectady, N. Y.
Racine Tool & Mfg. Co., Racine, Wis.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Wilson Welder & Metals Co., 132 King St., New York, N. Y.

WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene)
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Davis-Bournonville Co., The, (Air Reduction Sales Co.) 342 Madison Ave., New York, N. Y.
International Oxygen Co., Newark, N. J.
Linde Air Products Co., 30 E. 42nd St., New York, N. Y.
Oxweld Acetylene Co., Newark, N. J.
Prest-O-Lite Co., Inc., Indianapolis, Ind.

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WELDING GLASSES
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Oxweld Acetylene Co., Newark, N. J.

WELDING METALS (Certified)
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WELDING RODS
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Oxweld Acetylene Co., Newark, N. J.
Prest-O-Lite Co., Inc., Indianapolis, Ind.

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Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Farrell-Cheek Steel Foundry Co., Sandusky, Ohio.
Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.

WHEELS (Rolled Steel, Auto Truck)
Bethlehem Steel Co., Bethlehem, Pa.

WINDOW CLEANING MATERIAL
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American Steel Co., Pittsburgh, Pa.
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.
John A. Roebling's Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.

WIRE (Annealed, Bright, Galvanized)
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WIRE (Shapes)
American Spiral Spring & Mfg. Co., 5500 Butler, Pittsburgh, Pa.

WIRE (Threaded)
Progressive Mfg. Co., Torrington, Conn.

WIRE (Welding)—See WELDING RODS

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Wickwire Spencer Steel Corp., 41 E. 42nd St., New York, N. Y.

WIRE FENCE
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Pittsburgh Steel Co., P. O. Box 72, Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

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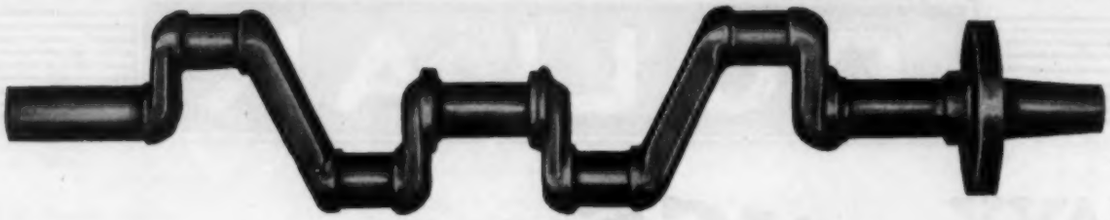

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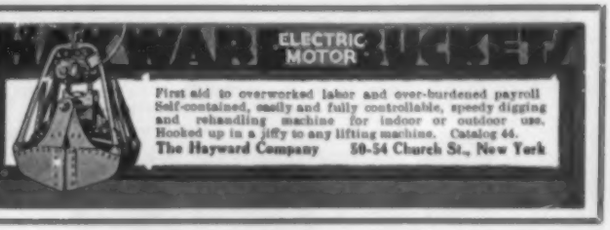

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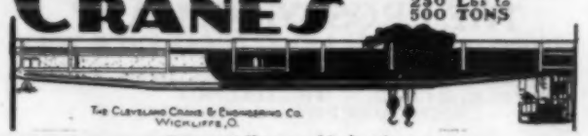

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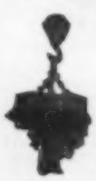

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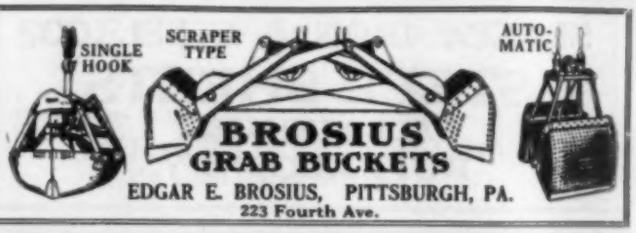

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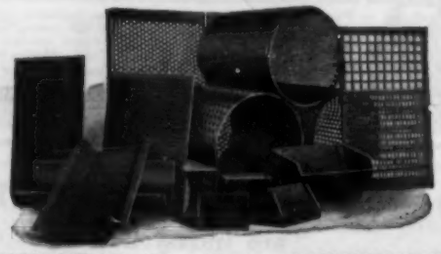

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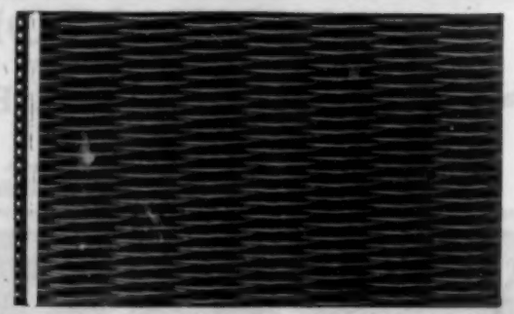

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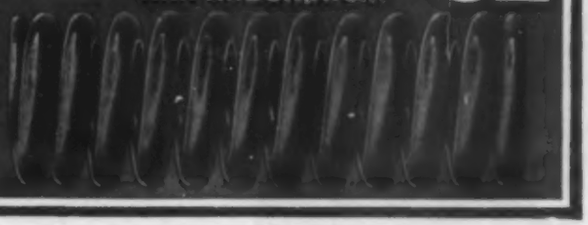

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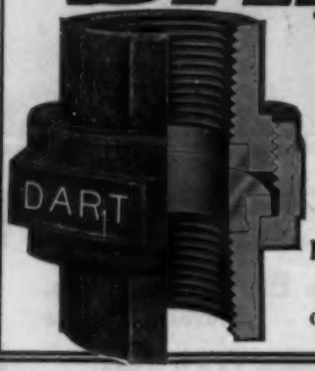

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IRON TRADE REVIEW

Resale Equipment News

Current Announcements and News of Plant Liquidations, Public Auctions of Equipment, Proposals, Bids, Sales, Etc.

June 28, 1923

MACHINERY, steel and equipment of the Century Steel Co. of America, Poughkeepsie, N. Y., is being liquidated by the Industrial Plants Corp., New York. The equipment includes a large foundry, machine shop and forge shop, in which are a 32-pot crucible furnace, seven steam hammers ranging in capacity from 150 to 3500 pounds, belt hammers, and about 500 tons of finished high speed and tool steel and also about 300 tons of alloy billets. The plant produces crucible steel ingots, tool steel bars, high speed steel, tungsten, chrome, vanadium and other alloy steels, the annual capacity being 2400 tons of ingots and 2000 tons of forged products. The plant will be liquidated by private negotiation.

* * *

The stock and equipment of the Hercules Iron & Supply Co. of 473 Atlantic avenue, Boston, was sold at public auction Thursday, June 21. Chester A. Bailey was the auctioneer.

* * *

The auction sale of the properties of the C. H. Wills & Co., Marysville, Mich., manufacturer of the Wills-Saint Claire automobile, has been postponed again, this time until July 3.

* * *

Jacob Ullman, 48-82 Oneida street, Buffalo, N. Y., is in charge of the disposition of 450 surplus government machine tools, from the Curtiss Aeroplane Co., plant, Buffalo.

* * *

The J. C. Grant Chemical Co., East St. Louis, Ill., is offering certain equipment of the Bauxite Products Co., Dupo, Ill., released by sheriff's sale. The equipment includes miscellaneous supplies, 2000 pounds of boxings and couplings; one milling machine; miscellaneous tools, wrenches, electrical instruments, etc.; several presses; generator; pumps; pipe-cutting machine; one turret lathe and a number of tanks.

* * *

The plant of George H. Adams, Hill, N. H., manufacturer of knitting needles was sold at auction Tuesday, June 26. This business has been in successful operation for more than 50 years. Chester A. Bailey was the auctioneer.

* * *

The Central Sales Office, Navy Yard, Washington, will sell surplus navy material at public auction, July 10-11 at the Navy Yard, New York. Various tools, 12 electric railway cars and 10 trailers will be included in the equipment sold.

* * *

The Murphysboro plant of the National Car Coupler Co., Attica, Ind., will be sold at auction at the plant on Tuesday, July 24. The property to be sold consists of 25 acres of land, the steel castings plant consisting of buildings, machinery, fixtures, etc. Randolph & Milford are the attorneys.

* * *

The complete plant of George S. Bond Co., Charlestown, N. H., was sold at auction June 18. The principal equipment consisted of woodworking machinery. Several large woodworking saws and planers were sold to furniture dealers. In addition tool room machines, light milling machines and drills were sold. The sale was made by J. E. Conant & Co.

* * *

The United States & Cuban Works Engineering Corp., Bradford, Pa. is being liquidated by the Industrial Plants Corp., 25 Church street, New York. The plant is made up of five modern structural steel buildings equipped with electric cranes. The entire plant including all of the real estate, the machine shop, foundry, erecting, assembling and testing shops, office buildings machinery and equipment etc. will be sold.

* * *

Liquidation of the former plant of the New York Sanitary Utilization Co., Barren Island, N. Y., is being made and a large assortment of steam and electrical equipment is being offered for sale. The equipment includes 24 boilers, 243 tanks of various types and sizes, 21 engines and hoists, 23 hydraulic presses, 3 air compressors, as well as pipe and fittings and a large list of miscellaneous equipment. The sale is being conducted by the Industrial Plants Corp., New York.

* * *

Boilers, pumps, locomotives, blowing engines, etc., at the Macungie furnace are being sold by H. Sofranscy Co., Allentown, Pa. This furnace was built in 1874 and repaired in 1902 and had an annual capacity of 25,000 tons. No. 1 vertical type blast engine was manufactured by Gartley & Fox, Minersville, Pa.; the No. 2, also vertical type is the Weiner type. Locomotives comprise one each broad and narrow gage built by H. K. Porter & Co., and one 50-ton built by the Baldwin Locomotive Works.

* * *

The Wright Roller Bearing Co., plant Twentieth street and Indiana avenue, Philadelphia is being auctioneered under masters sale by Samuel T. Freeman & Co., Philadelphia. The machinery comprises 56 automatic machines; 15 engine and machine lathes; eight hand-screw turret lathes; 5 universal milling machines; 4 shapers, 6 tool and cutter grinders; twist-drill grinders; power hack saws; 60 plain and internal grinders; vertical surface grinder; arbor presses; heating furnaces; power tumblers; compressor; motors from ½ to 50 horsepower; shafting, pulleys, leather and composition belting, etc. The equipment includes 350 tons chrome nickel bar steel; finished and unfinished parts of roller bearings; emery wheels small tools, chucks, collets, taps, gages and a large supply of finished bearings.

Sales Calender

July 3.—Receiver's sale of C. H. Wills & Co. Co. plant, Marysville, Mich., again postponed from June 30.

July 5-6.—Plant of Berlin Magneto Co., Buffalo, ordered at auction; Samuel L. Winternitz & Co., Chicago auctioneers.

July 14.—A large assortment of woodworking machinery, machine tools, contractors' and yard equipment, steel and supplies, under liquidation of the Newport Shipbuilding Co., Wilmington, N. C., offered at public auction by the Industrial Plants Corp., 25 Church street, New York.

July 24.—The National Car Coupler Co., Attica, Ind., will sell its Murphysboro plant at auction at the plant in Murphysboro, Ill.

"Where-To-Buy" Used Machinery

AIR COMPRESSORS

Carbon Steel Co. 99
Industrial Plants Corp. 93
McCoy-Brandt Machinery Co. 96
Wickes Machinery Co. 98

BENDING ROLLS

McCoy-Brandt Machinery Co. 96

BOILERS

Castle & Wilson 98
Industrial Plants Corp. 93

BOLT CUTTERS

Marr Galbreath Machinery Co. 95
O'Brien Machinery Co. 94

BOILER TUBES

Brenholts, Roy 98

BORING MILLS

Industrial Plants Corp. 93
McCabe, J. J., Lathe & Mchy Corp. 92
McCoy-Brandt Machinery Co. 96
Monarch Machinery Co. 94
Morey & Co., Inc. 97
Niles, F. H., & Co., Inc. 94
Partridge, Arthur S. 95
Russell Machine Co. 96
Washington Steel & Ordnance Co. 95

BRAKES

McCoy-Brandt Machinery Co. 96
Marr-Galbreath Machinery Co. 95

BULLDOZERS

Marr-Galbreath Machinery Co. 95

DRILLS

Haetten, J. E., & Co. 97
Niles, F. H., & Co., Inc. 94
Russell Machine Co. 96
Washington Steel & Ordnance Co. 95

ENGINES

Brenholts, Roy 98
Castle & Wilson 98
DeWitt-Seitz Co. 98
Follansbee Bros. 94
Industrial Plants Corp. 93
Nashville Industrial Corp. 98
National Can Corp. 98
Western Reserve Mfg. Works 98

FEED WATER HEATERS

Carbon Steel Co. 99
Nashville Industrial Corp. 98

FORGING MACHINES

McCoy-Brandt Machinery Co. 96

FOUNDRY EQUIPMENT

Washington Steel & Ordnance Co. 95

GEAR CUTTERS

DeWitt-Seitz Co. 98
Morey & Co., Inc. 97
Niles, F. H., & Co., Inc. 94
Washington Steel & Ordnance Co. 95

GENERATORS

Castle & Wilson 98
Industrial Plants Corp. 93
McCoy-Brandt Machinery Co. 96
Washington Steel & Ordnance Co. 95

GRINDERS

Haetten, J. E., & Co. 97
Industrial Plants Corp. 93
Morey & Co., Inc. 97
McCoy-Brandt Machinery Co. 96
Niles, F. H., & Co., Inc. 94
Washington Steel & Ordnance Co. 95

HAMMERS

Marr-Galbreath Machinery Co. 95
Morey & Co., Inc. 97
Niles, F. H., & Co., Inc. 94
O'Brien Machinery Co. 94
Riverside Machinery Depot 97
Washington Steel & Ordnance Co. 95

HOISTS

Hughes-Keenan Co. 94

LATHES

Delta Equipment Co. 96
Haetten, J. E., & Co. 97
Industrial Plants Corp. 93
McCabe, J. J., Lathe & Machinery Corp. 92
McCoy-Brandt Machinery Co. 96
Marr-Galbreath Machinery Co. 95
Morey & Co., Inc. 97
Niles, F. H., & Co., Inc. 94
Simmons Machine Tool Corp. 95
Washington Steel & Ordnance Co. 95
Wayne Machinery Co. 95, 96

LOCOMOTIVE CRANES

Green, L. A. 96
King, Philip T. 96
Weiss, B. M. 96

LOCOMOTIVES

Brenner, L., & Co. 96

MILLERS

Haetten, J. E., & Co. 97
Morey & Co., Inc. 97
Marr-Galbreath Machinery Co. 95
Niles, F. H., & Co., Inc. 94
O'Brien Machinery Co. 94
Riverside Machinery Depot 97
Russell Machine Co. 96
Simmons Machine Tool Corp. 95
Washington Steel & Ordance Co. 95

MOTORS

Castle & Wilson 98
Follansbee Bros. 94
DeWitt-Seitz Co. 98
Industrial Plants Corp. 93

PIPE MACHINES

McCoy-Brandt Machinery Co. 96
Marr-Galbreath Machinery Co. 95
O'Brien Machinery Co. 94

PLANERS

Haetten, J. E., & Co. 97
McCoy-Brandt Machinery Co. 96
Machinery & Supply Corp. 94
Morey & Co., Inc. 97
Marr-Galbreath Machinery Co. 95
Simmons Machine Tool Corp. 95
Washington Steel & Ordnance Co. 95

PRESSES

Industrial Plants Corp. 93
Marr-Galbreath Machinery Co. 95
Morey & Co., Inc. 97
Riverside Machinery Depot 97
Simmons Machine Tool Corp. 95
Washington Steel & Ordnance Co. 95

PUMPS

Carbon Steel Co. 99
Miles Machinery Co. 98

PUNCHES

Hughes-Keenan Co. 94
McCabe, J. J., Lathe & Machinery Corp. 92
Marr-Galbreath Machinery Co. 95
Morey & Co., Inc. 97

RADIAL DRILLS

Haetten, J. E., & Co. 97
Industrial Plants Corp. 93
McCabe, J. J., Lathe & Machinery Corp. 92
Marr-Galbreath Machinery Co. 95
Niles, F. H., & Co., Inc. 94
O'Brien Machinery Co. 94

RAILROAD EQUIPMENT

Frank, M. K. 96

RIVETERS

Marr-Galbreath Machinery Co. 95

SAWS

Industrial Plants Corp. 93
Morey & Co., Inc. 97

SCREW MACHINES

Morey & Co., Inc. 97
Riverside Machinery Depot 97
Washington Steel & Ordnance Co. 95
Wayne Machinery Co. 96

SHAPERS

Haetten, J. E., & Co. 97
Industrial Plants Corp. 93
McCabe, J. J., Lathe & Machinery Corp. 92
McCoy-Brandt Machinery Co. 96
Marr-Galbreath Machinery Co. 95
Morey & Co., Inc. 97
Niles, F. H., & Co., Inc. 94
Washington Steel & Ordnance Co. 95

SHEARS

Haetten, J. E., & Co. 97
Hughes-Keenan Co. 94
McCoy-Brandt Machinery Co. 96
Marr-Galbreath Machinery Co. 95
O'Brien Machinery Co. 95
Riverside Machinery Depot 97

SLOTTERS

McCabe, J. J., Lathe & Machinery Corp. 92
McCoy-Brandt Machinery Co. 96
Morey & Co., Inc. 97
Niles, F. H., & Co. 94
Washington Steel & Ordnance Co. 95

STRAIGHTENING MACHINERY

Hughes-Keenan Co. 94
Morey & Co., Inc. 97

TANKS

Shippers' Car Line 98

TAPPING MACHINES

Simmons Machine Tool Corp. 95

TESTING MACHINES

McCoy-Brandt Machinery Co. 96
Washington Steel & Ordnance Co. 95

THREADERS

Morey & Co., Inc. 97

TRAVELING CRANES

Brenholts, Roy 96
McCoy-Brandt Machinery Co. 96
Washington Steel & Ordnance Co. 95
Weiss, B. M. 96

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A few of the reasons for coming to the "Old Reliable House"

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If the tools you are looking for are not here—
Why—write for our "New List."

84" Swing x 46' Bed
Geared Head, Triple Geared
PUTNAM MOTOR DRIVEN LATHE
Front bearing about 18" long; spindle diameter 18"; apron control; face plate, 82" x 11" face; regular complete equipment, including two steady rests. Condition equal to new, still set up and may be inspected in operation.

84" x 60" x 30' Pond Planer
Motor Driven, complete with 30 H. P. motor, 4 heads, 2 swivel heads on rail and two side heads.

42" x 36" x 16' Openside Planer
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60-in. Horizontal Punch
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50-in. and 36-in. Punches
For Punching {1½" thru 1" Plate / 1" " ¾" "} Belt and Motor Drives.

10-16-ft. Swing Upright BORING MILL

"Betts Machine Co.'s" Extension type 10-ft. adjustable to 16-ft. Swing.

Has two heads on crossrail, having all the automatic feeds for boring, turning and facing.

Housings, double web, box form. Table 10-in. in depth.

Belt driven, with geared feeds. In thoroughly good condition. Especially adapted for shops doing a variety of work, as it covers such a wide range.

This Mill has just arrived at our Jersey City warehouse and may be inspected on car, but prompt action is necessary to secure special price before unloading.

McCABE "2-in-1" DOUBLE SPINDLE LATHES
32"-54" x 20' Bed.
26"-48" x 32' Bed.

NILES-BEMENT-POND, 24" SLOTTER, Motor Drive.
BEMENT-MILES, 120" x 42' Bed, Triple Geared LATHE.
NILES HORIZONTAL BORING MILL, 4¾" Bar, Knee Type, power raise.

Just a few each of the following sizes left—
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NEW "HIGH-DUTY"
3-step Cone Double Back Geared Lathes;

18" x 8-ft.	28" x 16-ft.	*All Steel*
18" x 10-ft.	30" x 14-ft.	*Quick Change*
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21" x 12-ft.	36" x 18-ft.	

40" x 12' Triple Geared, Geared Head, Q.C.

4-ft. arm Speed Box, Radial Drill.	16" stroke Shaper.
2½' arm Speed Box, Radial Drill.	14" stroke Shaper.
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Commencing 10:30 A. M. SHARP!! (Eastern Standard Time)

VALUATION $350,000.00

Everything will be sold without limit or reserve!!

SALE INCLUDES:

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This equipment is all of modern type and in excellent condition. Plant open for inspection from June 28th to the day of the sale.

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Industrial Plants Corporation

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BORING MILLS Horizontal and Vertical

BULLARD 24" New Era type Vertical, 3 jaw chuck table, maker's serial No. 10816 ..... $3300.00
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BULLARD 30" Vertical, one swivel turret head, plain table 675.00
BULLARD 36" Rapid Production type, Vertical, 3 jaw chuck table 2600.00
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NILES 50" Vertical, two swivel heads 2250.00
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BETTS 110" Vertical, two swivel heads plain table, weight 40,000 lbs. 8500.00
LUCAS Horizontal, No. 1 ..... 2000.00
GIDDINGS & LEWIS No. 0, (No. 32) Horizontal 2400.00

These boring mills, all of them complete, are thoroughly good tools. They are ready for instant service.

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1 Wood Hydraulic Hoist, 5 ton capacity, in good condition.

Also, 1 set of 42" Sheet Straightening Rolls with a capacity of 12 Ga. Material.

1 No. 3 Buffalo Forge Co. Hand Punch and Shear.

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PLATE PLANER

1—No. 6 Niles Plate Planer, Capacity for planing plates 2" thick by 36' long at one setting—Excellent condition—immediate delivery.—Full particulars on request.

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1 Used Rope Wheel Drive Unit with Shaft and Pillow Blocks complete: Diameter wheel 6 ft. 6 in.; 24 grooves 2 in. dia., heavy construction for rolling mill work.

Good condition.

Also used Motors, Exhausters, Blower, new Dust Tight Steel Bins, new and used Pipe Fittings.

All material will be sold subject to prior sale.

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79" BEMENT Double Head Driving Wheel Lathe, belt driven, with quartering attachment.
16" x 8' REED-PRENTICE Geared Head Q. C. G. Lathe.
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26" x 12' PUTNAM Heavy Duty Lathe.
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48" x 36" x 16' N-B-P Planer, two heads latest, box table.
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10" x 50" NORTON Plain Cylindrical Grinder.
14" x 50" NORTON Plain Cylindrical Grinder.
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No. 2 CINCINNATI Cutter Grinder.
No. 1½ LANDIS Internal Grinder.
20" GOULD & EBERHARDT High Duty Shapers, Motor Driven.
22" x 10' CINCINNATI Traverse Shaper.
No. 14 PRATT & WHITNEY Multiple Spindle Drill, cap. twelve 1½" holes.

42" BULLARD
RAPID PRODUCTION VERTICAL BORING MILL

30" vertical travel to heads, self-contained motor or single belt drive. Heavy Duty.

GARDAM Multiple Drill, cap. six 1¼"
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4' PRENTICE Radial Drill, Single Pulley Drive.
4' WESTERN Full-Universal Drill, tap. att.
3' AMERICAN Ball Bearing Sensitive Radials.
36" SNYDER Upright Sliding Head Drill.
37" BAUSCH Vertical Boring Mill.
44" PUTNAM Heavy Duty, like new.
51" BULLARD Vertical Boring Mill.
3" and 4" Horizontal Boring Mills.
1¼" ACME Six Spindle Vertical Nut Tapper.
18" BETTS Heavy Duty Slotter, belt driven.
8" NEWTON Slotter, very latest, like new.
No. 3 BECKER Universal Miller.
6" and 12" COX Pipe Machines.
4500 lb. BEMENT Steam Forging Hammer.
40 lb. BRADLEY Cushioned Helve Hammer.
NILES ¼" Plate Straightening Rolls.
No. 4 BROWN & SHARPE Gear Cutter.
1¼" GRIDLEY Multiple Spindle Automatics.
No. 60 HEALD Cylinder Grinder.

Send for our June list of the largest stock in the United States of slightly used, thoroughly overhauled and guaranteed MACHINE TOOLS, PRESSES, POWER, ELECTRICAL and CONTRACTORS' equipment.

F. H. NILES & CO., Inc.
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1—12" Williams power pipe machine.
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1—8" Loew motor driven pipe machine.
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1—8" Curtis & Curtis power pipe machine.
1—6" Curtis & Curtis power pipe machine.
1—6" Oster belt driven pipe machine.
1—4" Oster belt driven pipe machine.
1—4" Oster motor driven pipe machine.
1—4" Jarecki motor driven pipe machine.
1—2" Oster belt driven pipe machine.
1—2" Landis motor driven pipe machine.
1—1½" Acme belt driven bolt cutter.
1—3" Simplex plain radial drill.
1—No. 3 Kempsmith universal milling machine.
1—No. 3 Cincinnati universal milling machine.
1—No. 387-A Toledo rotary shear with circular attachment.
1—500 lb. Beaudry belt hammer.

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LIQUIDATION SALE

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13" x 6' Sebastian, C. R.
16" x 6' Fay & Scott, Q. C., C. R.
16" x 8' Bradford, Q. C., P. R.
18" x 8' Mueller, D.B.G., Q.C., C.R.
20" x 8' Boye & Emmes, Q.C., C.R., Tpr.
24" x 10' Bridgeford, P. R., Taper.
26" x 10' Niles-Bement-Pond, Q.C., C.R.
26" x 10' Bridgeford, Q.C., C.R.
26" x 14' Niles-Bement-Pond, Q.C., C.R.
28" x 12' Boye & Emmes, Q. C., C.R.
28" x 18' Schumacher & Boye, C. R.
36" x 12' Lodge & Shipley, T.G., Q.C., C.R.

LATHES—Direct Motor Driven
26" x 14' Bridgeford, C. R.
26" x 16' Bradford, C. R.
30" x 12' Niles-Bement-Pond, Q.C., C.R.
30" x 14' Niles-Bement-Pond, Q.C., C.R.
30" x 16' Niles-Bement-Pond, Q.C., C.R.
36" x 16' Niles-Bement-Pond, T.G., Q.C., C.R., Taper
36" x 16' Springfield, T.G., C.R.
38" x 14' Alliance, G.H., C.R.
38" x 16' Niles-Bement-Pond, T.G., Q.C., C.R., Taper
42" x 16' Putnam, T.G., Q.C., C.R., Taper
42" x 22' Putnam, T.G., Q.C., C.R., Taper

TURRET LATHES & SCREW MACHINES
3" Jones & Lamson, G.H., Double Spindle
3" x 36" Jones & Lamson, G.H.
21" Gisholt Std., 3⅛" hole, Tpr., Motor Drive
24" Gisholt Std., 3⅛" hole, Tpr., Motor Drive
24" Steinle Std., 6¼" hole, Tpr., Motor Drive
6¼" x 16" Potter & Johnson Automatic
2¾"-3¼" Cleveland Model A Automatic Screw Machine

PLANERS & SHAPERS
30" x 30" x 6' Gray Planer, 1 head
42" x 36" x 12' Gray Planer, 2 heads, 1 rail and 1 side head
24" Queen City B. G. Crank Shaper
24" Gould & Eberhardt B. G. High Crank Duty Shaper
24" Hendey Planer Drive Shaper
25" Smith & Mills B. G. Crank Shaper

BORING MILLS
48" Gisholt Vertical, 2 hds., G. Feeds
54" Niles Vertical, Single Head
45" Sellers Horizontal
54" Bement Horizontal

MILLING MACHINES
No. 1½ Oesterlein Universal
No. 2 Owen Universal
No. 2-B Brown & Sharpe, Plain
No. 4 Cincinnati Universal
No. 6 Becker Vertical
30" x 13" Smalley General Thread Miller, Mot. Drive
33" x 16' Gisholt Thread Miller, Motor Drive

DRILLS—Upright and Radial
12" 2-spindle Leland & Gifford, Bench
16" Kern Sensitive, Tapping Attachment
18" Champion Post Drill
20" Prentice Stationary Head
20" Ryerson Stationary Head
20" Leland & Gifford, Sensitive
32" Hoeffer, Sliding Head
34" Baker Bros., No. 416 Heavy Duty
40" Aurora, Sliding Head
17" Baker Auto. Turret Head
No. 5 Fox 30-spindle Multiple
No. 11 Pratt & Whitney 12-spindle Multiple
10" U. S. Electric, Bench
2½" Fosdick, Plain Radial
3' Morris, Plain Radial
3' Taylor Fenn, Plain Radial
3' Fosdick, Plain Radial
3½' Fosdick, Plain Radial
4' Bickford, Plain Radial
4' Fosdick, Plain Radial
4½' Niles, Half Universal

SLOTTERS
14" Sellers, All Feeds
18" Putnam, All Feeds, Motor Drive

GRINDERS
No. 1 Bath, Universal
No. 2 Lea, Universal
12" x 36" Landis, Plain
12" x 2" Landis, Plain
No. 3 Oesterlein, Cutter and Reamer
24" x 3" Springfield, Double End, Wet
54" Besley, Vertical Disc
Yankee Twist Drill

GEAR CUTTERS
30" x 12" Rhenania, Gear Hobber
36" Fellows, Gear Shaper

PRESSES
No. 4 Bliss Geared Double Crank
No. 7 Perkins Straight Side
No. 8 Perkins Straight Side
No. 28 Atlas Geared Cover
3½ ton Watson Stillman Vertical Hydraulic
100 ton Watson Stillman Horizontal Wheel Press
320 ton Wood Vertical Hydraulic
350 ton Wood Vertical Hydraulic
24½" x 16" Logemann Bros. Hydraulic Baling Press

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1000 lb. Toledo, Friction Board Drop
1100 lb. Bement, Single Frame, Steam
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2 ton Hand Travel, 16' span
3 ton Shepard Monorail
5 ton Alliance, 3 motor, 48' span
5 ton Whiting, 3 motor, 44' 6" span
25 ton Pawling & Harnischfeger, 4 motor, 71' span
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100,000 lb. Tinius Olsen and Riehle Bros. Tensile Strength
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No. 3 Kempsmith Universal Miller, complete.
No. 3 Standard Universal Geared Head Cincinnati Miller.
No. 3-B Hendey Plain Miller, complete.
No. 3-H LeBlonde Heavy Duty Plain Miller, complete.
No. 3 Cincinnati High Power Vertical Miller.
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7" Baker Tapping Machine, capacity 1½" to 7".
26" x 26" x 8' Gray Heavy Duty Planer.
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No. 2-B Milwaukee Universal Miller.
16" Gould & Eberhard BG Crank Shaper.
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8' Robinson Power Brake, for loga.
42" x 27' Bed Pond TG Eng. Lathe.
4" Williams; Acme 3", Pipe Machines.
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Compressors, 220 and 550 cu. ft., M.D.
Compressors, 489 and 1600 cu. ft., steam.
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Grinder, 12" x 48" Cincinnati Universal.
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1—15 x 6 Von Wyck, C.R.H.S.
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2—18" & 21" GISHOLT TURRET LATHES
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MISCELLANEOUS

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The following diversified list of power plant equipment is offered for sale on account of the liquidation of the properties of the Carbon Steel Company.

Two Ingersoll Rand Type No. 10 steam driven horizontal cross compound air compressors; steam cylinder 14" x 22" x 16"; air cylinder 12" x 19" x 16", with 6" x 12" heavy cast iron flywheel.

One Ingersoll Rand Imperial Type XB-2, motor driven air compressor; air cylinder 14" x 23" x 20", belted to Sprague Electric Co. 300 h. p., 230 volt, d. c. motor, type C.

One Wilson Snyder 14" x 9" x 18" horizontal single cylinder boiler feed plunger pump.

One Epping Carpenter 14" x 8" x 14" horizontal single cylinder boiler feed plunger pump.

One Harrison Safety Boiler Co. Cochrane feed water heater and purifier 42" x 42" x 6' 6" high, on four 4" x 30" pipe legs, on 42" x 42" x 1" cast iron plate, 8" inlet and 6" outlet.

One 42" x 10' x 3/8" plate vertical feed water heater on steel stand.

Two 48" x 10' x 3/8" steel plate single riveted air receivers, on cast iron base.

One Wilson Snyder Mfg. Co. 18" x 6" x 18" horizontal duplex hydraulic plunger pump, with air chamber.

Write for indexed catalogue listing the entire property of the Carbon Steel Co., now offered for sale as a whole or in part.

CARBON STEEL CO.
PITTSBURGH, PA.

Equipment Wanted

For Machine Shops, Foundries, Iron and Steel Works, Mines, Railroads and Metal-Working Plants Generally

Advertising Rates: 1" One Time $5.00; 2" One Time $9.50; 3" One Time $14.00; 4" One Time $18.00.
RATES FOR LARGER SPACE OR LONGER PERIODS FURNISHED ON REQUEST

PUNCH WANTED

Multiple punch, 5 ft. to 6 ft. between housings, capacity ¼" plate. Also squaring and splitting shear, 6 ft. between housings, 36" gap, capacity ⅜".

STEARNS-ROGER MFG. CO.
Denver, Colo.

Wanted
REINFORCING BAR SHEAR

Capacity two pieces 1¼" square. Either direct connected or Belt driven, with or without motor, current A.C. 60 cycle, 3 phase.

Des Moines Steel Company
Des Moines, Iowa

Want a Position?

There are many good jobs open to men who possess the initiative to seek them out. A Position Wanted advertisement will help.

601

Now is the time

If you are in need of additional equipment, now is the time to buy.

Today there is, in most every plant, one or more idle machines which will never be of use to the owners again. Much of this is "war" machinery; other equipment has been laid aside and replaced with new tools.

Hundreds of bargains are now available for manufacturers who will let their requirements be known.

What do you need?

Voice your wants throughout the metal-working industries with an advertisement in the

EQUIPMENT WANTED SECTION

639

Locate the right machine at the right price through an ad here

Employment

POSITIONS OFFERED
Minimum ad., 50 words, $3.00
Additional words, $.06 each

When a box address is desired, count seven words in addition to your copy

POSITIONS WANTED
Minimum ad., 30 words, $1.00
Additional words, $.03 each

Employment Service

SOUTHERN NEGRO LABOR SUPPLIED We employ best Negro common labor direct from south to your plant. Careful selection. Advance orders taken. Consult us. Parker System Labor Service, 419 East 42nd, Chicago.

THE BEST WAY TO GET A GOOD position in drafting or engineering is to file application direct with some of our clients who are depending on us to get competent and experienced applicants for their vacant positions. Send stamp for blank and list of vacant positions. The Cleveland Engineering Agency Co., Rose building, Cleveland, O.

SALARIED POSITIONS $2500 TO $25,000 upward; executive, technical, administrative, engineering, manufacturing, professional, managing, financial, etc., all lines. If you are qualified and receptive to tentative offers for a new connection, you are invited to communicate in strict confidence with the undersigned, who will conduct preliminary negotiations for such positions. A method is provided through which you may receive overtures in confidence, without jeopardizing present connections, and in a manner conforming strictly to professional ethics. Send name and address only; preliminary particulars will be sent without obligating or compromising you in any way. R. W. Bixby, Inc., 416 Lockwood building, Buffalo, N. Y.

Positions Offered

MALLEABLE FOUNDRY SUPERINTENDENT:—FOUNDRY IN MIDDLE WEST HAS OPPORTUNITY FOR MAN OF EXPERIENCE IN AUTOMOBILE, RAILROAD AND GENERAL WORK. STATE AGE, SALARY DESIRED, PREVIOUS EXPERIENCE AND REFERENCES. ADDRESS BOX 815, IRON TRADE REVIEW, CLEVELAND.

Positions Offered

WANTED

STEEL MILL DRAFTSMEN

State experience and salary expected in first letter or apply personally at Jones & Laughlin Steel Corporation, Aliquippa Works, Woodlawn, Pa.

SALESMAN

We are looking for a real live wire Malleable Iron Casting salesman who has covered territory east of Pittsburgh and has had experience at such.

State references, experience, salary and details. Good opportunity for man with real selling ability in our jobbing foundry.

Address Box 817, IRON TRADE REVIEW, Cleveland.

WANTED:—FIRST CLASS LAYEROUT, for Steel plate work used around Blast Furnaces and Steel Plants; shop located in Youngstown district. State experience, salary expected. Prompt acceptance necessary. Address Box 810, IRON TRADE REVIEW, Cleveland.

WANTED:—STEEL FREIGHT CAR Draftsmen, particularly Detailers and a few checkers. Apply to Steel Car Engineer, Bethlehem Steel Company, Bethlehem, Pa.

Positions Wanted

DIRECTOR OF PRODUCTION, 12 years planning and scheduling work in machine and structural shops, gray iron, malleable and steel foundries. Detroit district. Address Box 767, IRON TRADE REVIEW, Cleveland.

Positions Wanted

LOW PHOSPHORUS BLAST FURNACE superintendent of exceptional ability is seeking employment with a company who may wish to employ a competent man. Address Box 811, IRON TRADE REVIEW, Cleveland.

METAL MANUFACTURING EXECUTIVE who has made good in reading costs and expediting production in gray iron foundry, pattern, machine, forge and boiler shops, available at once. Prefer Cleveland district or Canada. Technical man. Shop experience. Address Box 812, IRON TRADE REVIEW, Cleveland.

GENERAL MANAGER, YALE GRADUATE mechanical engineering, experienced in buying, selling, handling men, machinery, materials and money desires position as purchasing agent or manager. Address Box 805, IRON TRADE REVIEW, Cleveland.

POSITION AS OPEN HEARTH MELTER FOREMAN. 12 YEARS PRACTICAL EXPERIENCE INCLUDING 2 YEARS WITH HEROULT ELECTRIC FURNACE PROCESS, MAKING ALL GRADES OF STEEL FOR INGOTS OR STEEL CASTINGS. GOOD REASONS FOR DESIRING CHANGE. ADDRESS BOX 806, IRON TRADE REVIEW, CLEVELAND.

ROLL-TURNER, DESIGNER, PLAIN, special sections. Merchant, experienced rolling, knowledge mill equipment. Designers position or capacity requiring combined experience. References. Address E. O. H., E. 62nd, Chicago, Ill.

Why have you referred to this page?

Evidently you are either in search of a competent man or else you are seeking a connection.

If you do not see an advertisement representing the man or position you are seeking, you can quickly and effectively establish connections through an advertisement of your own placed in the next issue of

IRON TRADE REVIEW

649

Opportunities

Advertisements in this section are referred to by those seeking plants and plant sites, miscellaneous semi-finished and finished raw materials; by those who desire agencies.
Advertising Rates: 1" One Time $5.00; 2" One Time $9.50; 3" One Time $14.00; 4" One Time $18.00.

For Sale

STOVE PATTERNS

Complete set of Patterns for Steel Range, Cast Range, Cast Cook Oak Heaters, Base Burners and Gas Ranges for sale at very attractive figure.

Thoroughly up-to-date and practically all aluminum patterns. A splendid opportunity for small foundry to manufacture stoves. Also a good opportunity for a stove factory to complete their line. Write for full particulars.

WM. H. STRENGSON
1561 Garland Ave. Detroit, Mich.

LET a classified-ad in these columns lead you to a ready market for that surplus material.

You will find it worth while to advertise *right here* next week.

6141

NOTICE OF SALE

Notice is hereby given that the undersigned will offer at public sale at the Plant in the city of Murphysboro, Illinois, to the highest, responsible bidder, the following described property situated in the City of Murphysboro, Jackson County, Illinois, namely:

1. Twenty-five (25) acres, more or less, situated in Sections 3, 9 and 10, Township 9, south; range 2, west of the third principal meridian.

2. The Steel Castings plant, consisting of all of the buildings, machinery, fixtures and improvements of every kind and character located on the above described land.

3. The good-will of the owner in the business of the above described plant.

The sale will be held at the plant on

TUESDAY, JULY 24th, 1923

at 2:00 o'clock in the afternoon

TERMS OF SALE

Twenty-five thousand dollars ($25,000.00) must be paid by the successful bidder in cash, or by certified check; fifty per cent. of the remainder to be due in six months thereafter, the balance in one year thereafter, the deferred payments to draw six per cent. interest from date.

The purchaser will have the privilege of paying all in cash. A deed for the property will be delivered on full payment of the purchase price.

An abstract of title, showing a good merchantable title in the seller, subject to the terms of a written contract on the records of said County, will be furnished the purchaser, with an opportunity given to have the abstract properly examined.

All parties interested may send inquiries to the undersigned or to their attorneys, as noted.

THE HARRISON STEEL CASTINGS CO., INC.
ATTICA, INDIANA

Randolph & Milford, Lawyers,
308 Schultz Building
Lafayette, Indiana

Want a used planer—lathe?

Hundreds of bargains are available for the manufacturer who will let his requirements be known.

Many machine tools are now idle, never to be needed again by their present owners; other good, used equipment has been replaced by larger tools and can be secured very reasonably.

What do you need?

Save time and money by telling the metal-working industries through an advertisement in the

EQUIPMENT WANTED SECTION

638

Today's opportunities are tomorrow's sales

Fill-in and Contract Work

Buyers refer to the cards in this section when they have orders to place for castings, stampings, forgings, screw machine products, patterns, special machinery, jigs, tools, dies, etc.

Rates Per Insertion on Yearly Basis 1"—$3.75 : : 2"—$7.00 : : 3"—$10.00 Rates for Other Spaces Furnished on Request

"SCRAP METALS"

By George H. Manlove and Charles Vickers

A complete, authoritative handbook on scrap iron, steel and metals.

The only book about scrap metals that has ever been written

Price $3.00 a copy, including delivery.

THE PENTON PUBLISHING CO.
Book Publishers
Cleveland, Ohio

611

DO YOU USE—
Gray Iron
Brass or
Bronze
CASTINGS?
We make them to your satisfaction—ask for quotations
The Turner & Seymour Mfg. Co.
Torrington, Connecticut

SCREW SEND FOR QUOTATION
HEAT TREATING—GRINDING
PRODUCTS
THE CINCINNATI SCREW CO.
DEPT. R., LOVELAND, OHIO

WANTED

Medium Heavy Work

We have one of the best equipped plants in the country for handling medium heavy work. All new and up-to-date equipment served by traveling cranes. Complete pattern shop, gray iron foundry, machine shop and steel fabricating shop.

Let us figure with you on any fabricated steel, steel tanks, engines, pumps, or special machinery of any kind.

We are especially interested in a good line of equipment to manufacture.

THE SMITH GAS ENGINEERING CO.
Dayton, Ohio

We have a Well Equipped Daylight Machine Shop

For building special machinery
Special gasoline and steam motors, etc.
Let us figure with you.
Lammert & Mann Company
Wood and Walnut Sts. Chicago, Ill.

ALL KINDS STAMPINGS
BLANKING and FORMING
ASSEMBLING WORK
Lindsay Chaplet & Mfg. Co.
Harrison Bldg. Philadelphia, Pa.

MACHINE WORK
turned out exactly as you want it and just when you want it

We are completely equipped—lathes, planers, milling machines, radial drills, etc.
Let us go over your blue prints and estimate.

YORK MILK MACHINERY CO.
YORK, PA.

A single inquiry
often results in a
STEADY CUSTOMER

Advertise in the
Fill-In and Contract Work Section
of
IRON TRADE REVIEW

640

Consult these advertisers when you have contract work to place

Index to Advertisements

The star (*) indicates that the advertisement appears alternate weeks, the dagger (†) once a month.

A

†Abendroth & Root Mfg. Co... —
†Abramsen Engineering Co.. 35
†Acme Fire Clay & Coal Co. —
Acme Steel Goods Co..... 75
Acme Steel & Malleable Iron Works, Inc. 67
Addy, Matthew, Co..... 81
*Adrian Furnace Co..... 81
Air Reduction Sales Co..... 40
Air-Tight Steel Tank Co.... 76
Allegheny Steel Co..... 10
†Alliance Brass & Bronze Co. —
*Alliance Machine Co..... —
Alliance Structural Co..... 75
Allis-Chalmers Mfg. Co..... 29
*American Adamite Co..... 36
American Bridge Co..... 16
American Car & Foundry Co. —
American Foundry & Construction Co. 78
American Foundry Equipment Co. 24
American Industrial Furnace Corp. 78
*American Malleable Castings Association, The ..... —
American Nickel Corp..... 86
American Pressed Steel Co.. 74
American Punch & Shear Works 51
American Refractories Co.. —
†American Rolling Mill Co 6
American Sheet & Tin Plate Co. 74
*American Spiral Spring & Mfg. Co. ..... —
*American Steel Co..... —
American Steel & Wire Co. 77
Ams, Max, Machine Co.... 34
Andrews Steel Co..... 14
†Angle Steel Stool Co..... —
*Apollo Steel Co..... 74
Arcade Malleable Iron Co.. 67
Armington Engineering Co.. 73
†Armstrong Cork & Insulation Co..... —
Ashland Fire Brick Co.... 88
*Atlas Car & Mfg. Co.... —
*Atlas Steel Casting Co.... 59
Atlas Steel Corp..... 11

B

Babcock & Wilcox Co. 76
Babcock & Wilcox Tube Co., The 24
*Bailey, William M., Co.... —
†Bartlett, C. O., & Snow Co. —
†Bassick Manufacturing Co. The ..... —
*Bay City Forge Co..... —
Bedaux, Chas. E., Co..... 79
*Bell City Malleable Iron Co. 63
Belmont Iron Works..... 75
Bethlehem Steel Co..... 83
Bettcher Stamping & Mfg. Co. 74
Birdsboro Steel Foundry & Machine Co. 28
Blackwood Electric Steel Corp. 61
Blaw-Knox Co..... —
*Bliss, E. W., Co..... —
*Bliss & Laughlin, Inc.... 12
*Bonnot Co., The ..... —
†Bour, L. J., Refractories Co., Inc. ..... —
Bourne-Fuller Co..1913 (Editorial)
Bradley, C. C., & Son, Inc. 34
†Brighton Fire Brick Co.. —
Bristol Co., The..... 80
Brosius, Edgar E..... 73
†Brown Hoisting Machinery Co. ..... —
†Browning Co..... 17
*Budd, Edward G., Mfg. Co. —
Buffalo Forge Co..... 51
Buffalo Foundry & Machine Co. 63
Buffalo Steam Pump Co.... —
Byers Machine Co., The.... 73

C

*Calder, Geo. H., Co..... 53
Calorizing Co. of Pittsburgh .....1915 (Editorial)
Canton Forge & Axle Co.. 72
*Canton Foundry & Machine Co., The..... 22
Carlyle Johnson Machine Co. 38
Carnegie Steel Co..... 5
*Caroline Foundry Co..... 69
†Cascade Foundry Co..... —
Celite Products Co..... 88
Central Iron & Steel Co.. 18
Central Steel Co..... —
Central Tube Co..... 77
Chambersburg Engineering Co. 34
Champion Machine & Forging Co. 69
*Champion Rivet Co..... —
Chapman Engineering Co.. 53
Chase, Frank D., Inc..... 79
Chicago Pneumatic Tool Co. 23
Chicago Rawhide Mfg. Co. 86
Chicago Steel Foundry Co.. 63
Cincinnati Screw Co..... 103
†Clark Bros. Bolt Co..... —
†Clearfield Brick Mfg. Co. 88
*Clearfield Machine Shops... 88
Cleveland & Buffalo Transit Co., The ..... —
*Cleveland-Cliffs Iron Co.... —
Cleveland Crane & Engineering Co. 55, 73
Cleveland Knife & Forge Co. 51
*Cleveland Metal Products Co. ..... —
Cleveland Pneumatic Tool Co. 24
*Cleveland Punch & Shear Works Co. 39
*Cleveland Wire Cloth & Mfg. Co. ..... —
Columbia Steel Co. (Elyria, O.) 18
Columbus Forge & Iron Co.. —
Columbus Malleable Iron Co.. 67
Commercial Steel Casting Co., The 59
†Connersville Blower Co.... —
Contract Work Section..... 103
Cork Spring Co..... 77
Cooper, C. & G., Co..... 53
†Copper & Brass Research Association ..... —
†Crane Co. ..... —
Crescent Refractories Co.... 89
Crocker Brothers 81
Crosby Co..... 74
Crucible Steel Casting Co. (Cleveland, O.) 63
Cutler-Hammer Mfg. Co. 21
Cutler Steel Co. 75
*Cyclops Foundry Co..... —

D

Danville Malleable Iron Co. 65
Dart, E. M., Mfg. Co..... 78
Davis-Bournonville Co. 80
†Davidson, N. C., Gas Burner & Welding Co..... —
Dayton Malleable Iron Co.. 67
Decatur Malleable Iron Co. 65
Delaware River Steel Co.... 81
Detroit Seamless Steel Tubes Co. 20
Dixon, H. L., Co..... 28
Donner Steel Co., Inc..... 20
Dover Fire Brick Co..... 89
Drop Forging Co. of New York 72
†Dubois Iron Works ..... —
†Duer Spring & Mfg. Co... —
Duff Patents Co., Inc.... 51
Duquesne Steel Foundry Co. 63

E

Eastern Machinery Co..... 51
Eastern Steel Castings Co.. 63
Eaton, Rhodes & Co..... 84
Eccles, Richard, Co..... 71
Eichleay, John, Jr., Co.... 75
Electric Controller & Mfg. Co. .....Back Cover
Electro Metallurgical Sales Corp. 87
*Ellis, Frank I..... 79
Employment Section 101
Equipment Wanted 100
Erdle Perforating Co..... 74
Erie City Iron Works..... 76
*Erie Foundry Co..... —
Erie Steel Construction Co. 73
†Estep, Frank L..... —
*Euclid Crane & Hoist Co. —
Everitt Engineering Co..... 77

F

†F. & H. Foundry Co..... —
Falk Corp. 53
Farrell-Cheek Steel Foundry Co. 63
Fawcus Machine Co..... 51
†Federal Signal Co..... —
Federal Steel Foundry Co.. 63
†Ferguson, The H. K., Co. —
Firth-Sterling Steel Co..... 3
Flexible Steel Lacing Co.... 49
Ford, J. B., Co..... 80
†Franklin Steel Works..... —
†Frazer & Jones Co..... —
Freyn, Brassert & Co..... 79
Fuller Engineering Co..... 78

G

General Drop Forge Co.... 72
General Electric Co..... 27
Gibson, Wm. D., Co..... 77
*Globe Iron Co..... —
Greer Steel Co..... 18
*Griffin Mfg. Co..... —
Gulf States Steel Co..... 77

H

*Hadfield-Penfield Steel Co.. —
Hagan, Geo. J., Co..... 3
Hammond Iron Works..... 76
Hanna, The M. A., Co..... 89
Harbison-Walker Refractories Co. 88
†Harrisburg Pipe & Pipe Bending Co. ..... —
Harrison Steel Castings Co., Inc. 102
*Hauser-Stander Tank Co.... —
*Haws Refractories Co..... —
Hayward Co..... 73
†Hein Furniture Co..... —
Heltzel Steel Form & Iron Co. 75
Hendrick Mfg. Co..... 74
Heppenstall Forge & Knife Co. 72
Herman Pneumatic Machine Co. 55
Hickman, Williams & Co., Inc. 81
Hillman Coal & Coke Co. 84
Hillside Fluor Spar Mines.. 87
†Hinman, D. A., & Co..... —
Hoevel Mfg. Corp..... 55
Horsburgh & Scott Co.... 32
*Hubbard Steel Foundry Co. 30
Hunter Saw & Machine Co. 53
Hyatt Roller Bearing Co.... —
†Hyde Park Foundry & Machine Co. ..... —
*Hyman, Michaels, Co. ..... —

I

Illinois Malleable Iron Co.. 69
*Illinois Steel Co..... —
*Illinois Steel Co. (Warehouse Dept.) 12
Industrial Works 22
*Ingersoll-Rand Co..... 25
Inland Steel Co..... 8
International Fuel & Iron Corp. ..... —
International Nickel Co., The 86
*International Oxygen Co.... 73
†Interstate Iron & Steel Co.. 9
*Iowa Malleable Iron Co.. —
Ironton Fire Brick Co..... 89
Iron Trade Products Co..... 84
Irving Iron Works Co.... 40
Irwin Fuel Co..... 85

J

Jenkins Bros..... 78
Johnson, Carlyle Machine Co. 38
Johnson-Peter Co..... 76
Jones, W. A., Foundry & Machine Co. 32
†Jones & Laughlin Steel Corp. —

K

Kalamazoo Malleable Iron Co. 65
†Kane & Roach ..... —
†Kardong Brothers..... —
*Keating, E. F., Co..... —
Kennedy, Julian 79
Keokuk Electro Metals Co.. 86
*Keystone Bronze Co..... —
Kidd Drawn Steel Co..... 80
Kier Fire Brick Co..... 88
†Kinnear Mfg. Co..... —
*Koppers Co. ..Inside Front Cover
*Kratzer, W. N., Co..... 75

L

Laclede Steel Co..... 75
Ladish Drop Forge Co.... 71
Laclede-Christy Clay Products Co. 89

Engineering Directory, Pages 78, 79
Contents, Page 1870 (Editorial)
"Where-to-Buy," Page 48
Classified Advertisements, Pages 91-103

Index to Advertisements

Lake Erie Bolt & Nut Co. 77
†Lake Shore Engine Works.. —
Lakeside Malleable Castings Co. 65
Lammert & Mann Co. 103
*Lancaster Steel Products Corp. 49
†Landis Machine Co. —
*Landis Tool Co. 41
Laughlin, Alex. & Co. 79
Lavino, E. J., & Co. 89
†Lawrenceville Bronze Co. —
†Leard, Wm., Co. —
Leavitt, C. W., Co. 87
Lewis Foundry & Machine Co. 37
†Linde Air Products Co. Inside Back Cover
Lindsay Chaplet & Mfg. Co. 103
Link-Belt Co. 19, 65
Lockhart Iron & Steel Co. 8
Logemann Brothers Co. 47
Long & Allstatter Co. 51
Lukens Steel Co. —

Mc

†McCalla, Harold, Co. —
McClintic-Marshall Co. 75
*McClure, G. W., Son & Co. 78
McConway & Torley Co. 80
McKee, Arthur G., & Co. 79
McKee, Willis 78
McMyler Interstate Co. 73

M

Mackintosh-Hemphill Co. 31
*Mansfield Sheet & Tin Plate Co. Front Cover
Marion Malleable Iron Works 65
Marquette Ore Co. 83
†Marshall, S. M. —
Matthews, Jas. H., & Co. 69
Maynard Electric Steel Casting Co. 63
†Merrill Bros. —
*Mesta Machine Co. —
Metal & Thermit Corp. 86
Milwaukee Electric Crane & Mfg. Co. 73
Milwaukee Steel Foundry Co. 59
*Mohr, J. J., & Son. 81
*Moline Malleable Iron Co. 65
*Moltrup Steel Products Co. 12
Moore, W. E., & Co. 79
Morgan Construction Co. 53
†Morris Machine Wks. —
Morris, Wheeler & Co. 8
Morton Mfg. Co. 51
Mount Vernon Bridge Co. 79
†Mutton Hollow Fire Brick Co. —

N

National Drawn Steel Co. 16
National Engineering Co. 24
National Machinery Co. 49
National Roll & Foundry Co. 51
National Tube Co. 15
Newark Malleable Iron Works 67
†New Jersey Zinc Co. —
Newport Rolling Mill Co. 10
†New Process Copper Castings Co. —
*Niagara Electric Steel Corp. —
Niles-Bement-Pond Co. 22, 49
Niles Steel Products Co. —
*North Buffalo Hardware Foundry —
Northern Engineering Works 73
Northern Malleable Iron Co. 67
†Northwestern Malleable Iron Co. —
*Nuttall, R. D., Co. 32

O

Ohio Electric & Controller Co. 73
Ohio Grease Co., The 55
Ohio Machine Tool Co. 51
Ohio Steel Foundry Co. 59
*Ohio Structural Steel Co. —
Oliver Iron & Steel Corp. 26
Oliver Iron & Steel Corp. (Morris & Bailey Div.) 75
Opportunities Section 102
Orton & Steinbrenner Co. 22
*Otis Steel Co. 30
*Oxweld Acetylene Co. —

P

Pacific Coast Steel Co. 79
†Pacific Lumber Co. —
Pangborn Corp. 55
Pannier Bros. Stamp Co. 86
†Pardee Steel Corp. —
†Park & Williams, Inc. —
Pawling & Harnischfeger Co. —
Pelton Steel Co. 63
Penn Iron & Steel Co. 10
Penn Mold & Mfg. Co. 14
Pennsylvania Engineering Works 79
Peoria Malleable Castings Co. 65
†Perin, C. P. —
Petroleum Iron Works Co. 76
Philadelphia Steel & Iron Co. 71
*Phillips, F. R., & Sons Co. —
†Phillips & McLaren Co. —
Phoenix Bridge Co. 75
Phoenix Iron Co. 75
Pickands, Mather & Co. 82
Pilling & Co. 84
†Pittsburgh Cold Rolled Steel Co. —
†Pittsburgh Crushed Steel Co. —
Pittsburgh-Des Moines Steel Co. 76
Pittsburgh Electric Furnace Corp. 78
Pittsburgh Knife & Forge Co. 72
Pittsburgh Malleable Iron Co. 67
*Pittsburgh Piping & Equipment Co. —
Pittsburgh Rolls Corp. 26
*Pittsburgh Steel Co. —
*Pittsburgh Tool Steel Wire Co. 80
Pittsburgh Valve Foundry & Construction Co. 78
Platt Iron Works 51
Pollak Steel Co. 71
Portage Silica Co. 55
Porter, H. K., Co. 73
†Portsmouth Refractories Co. —
†Powell, William, Co. —
†Prest-O-Lite Co. —
Progressive Mfg. Co. 26
Pyro Clay Products Co. 88

Q

Queens Run Refractories Co., Inc. 89
Quigley Furnace Specialties Co., Inc. 89
Quinn, Clement K., & Co. 82

R

*Racine Steel Castings Co. 63
†Racine Tool & Machine Co. —
Raymond Mfg. Co., Ltd. 26
Reading Steel Casting Co. 59
†Reliance Steel Casting Co. 59
Republic Creosoting Co. 86
Republic Iron & Steel Co. 20
†Richards, I. P., Co., Inc. —
Riter-Conley Co. 75
†Rockford Bolt Co. —
Rockford Drop Forge Co. 71
Rockford Malleable Iron Works 65
†Rodd Co., The —
Roebling's, John A., Sons Co. 77
Rogers, Brown & Co. 81, 86
Roots, P. H. & F. M., Co. 53
*Ross-Meehan Foundries —
Runyon, W. C., & Co. 82
Russell, Burdsall & Ward, Bolt & Nut Co. 77
†Ryan, F. J., & Co. —
Ryerson, Joseph T., & Son 42

S

St. Louis Malleable Casting Co. 67
Samuel, Frank, & Co. 86
*Savage Mountain Fire Brick Co. 89
*Scranton Forging Co. —
Second-Hand Machinery 91
Seneca Iron & Steel Co. 74
†Seneca Pattern Works 55
Seneca Wire & Mfg. Co., The 77
Sharon Foundry Co. 59
Shepard Electric Crane & Hoist Co. —
†Shoop Bronze Co. —
*Shover, Barton R. 79
Shuster, F. B. Co. 53
*Simonds Mfg. Co., (Pittsbugh, Pa.) —
*Sivyer Steel Casting Co. 1917 (Editorial)
*Skybryte Co., The 55
†Sleeper & Hartley, Inc. —
Smith Gas Engineering Co. 103
Smith, Geo. H., Steel Casting Co. 63
Smythe, S. R., Co., Inc. 78
Snead Architectural Iron Works 75
Snyder, W. P., & Co. 85
Soisson, Joseph, Fire Brick Co. 89
Sotter Brothers, Inc. 76
*Stamp Electric Hoist Co. —
Standard Engineering Co. 30
*Standard Foundry Co. —
*Standard Gauge Steel Co. —
†Standard Sand & Machine Co. —
Standard Tin Plate Co. 74
*Star Clay Products Co. 88
Stearns-Roger Mfg. Co. 100
*Steel Plate Products Co. 76
Stewart Furnace Co. 81
Stowe-Fuller Co. 88
Straub, A. A., Coal & Coke Co. 85
*Streine Tool & Mfg. Co. —
†Strieby & Foote Co. —
*Superior Basic Brick Co. 88
*Superior Steel Corp. —
†Sutton-Abramsen Engineering Co. 35
Swindell, Wm., & Brothers 78
†Symington, T. H., Co. 65

T

Tate-Jones Co. 79
*Taylor, N. & G., Co. 75
†Taylor-Wharton Iron & Steel Co. —
Taylor-Wilson Mfg. Co. 38
Temple Malleable Iron & Steel Co. 63
Tennessee Coal, Iron & R. R. Co. 80
Thomas Spacing Machine Co. 91
*Thompson & Co. 40
*Titanium Alloy Mfg. Co. —
Tod-Stambaugh Co. 85
Toledo Machine & Tool Co. 34
Transue & Williams Steel Forging Corp. 72
Treadwell Engineering Co. 53
Trumbull Steel Co. 16
*Truscon Steel Co. —
Turner & Seymour 103

U

Union Drawn Steel Co. 41
Union Mining Co. 89
†Union Steel Casting Co. —
†United Compound Co. —
United Engineering & Foundry Co. 33
†U. S. Cast Iron Pipe & Foundry Co. —
*U. S. Nickel Co. —
U. S. Silica Co. 55
Used and Rebuilt Equipment. 92

V

Valley Mould & Iron Corp. 14
Vanadium Alloys Steel Co. 80
*Vanadium Corporation of America 7
Vaughn Machinery Co. 49
Vermillion Malleable Iron Co. 67
†Vulcan Furnace & Equipment Co. —

W

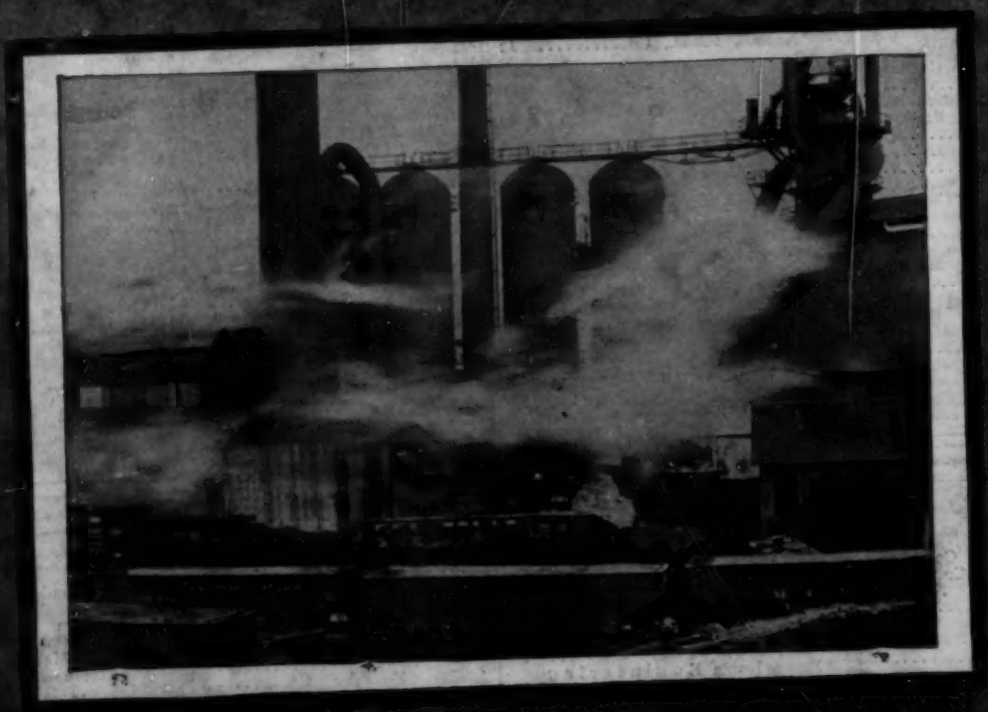
Wanner Malleable Castings Co. 67
†Wappat Gear Works —
†Warren Tool & Forge Co. —
Wellman Bronze Co. 60
Wellman-Seaver-Morgan Co. 53
†Westinghouse Electric & Manufacturing Co. —
*West Leechburg Steel Co. —
West Steel Casting Co. 59
Wheeling Mold & Foundry Co. 57
Wheeling Steel Corp. 4
Whiting Corporation 73
†Whiton, D. E., Machine Co. —
*Wickes Boiler Co., The —
Wickwire Spencer Steel Corp. 2
†Wiggins, John B., Co. —
Wilcox, D., Mfg. Co. 71
*Wilfong, Millard F., Iron Works Co. —
Williams & Co., Inc. 78
Williams, G. H., Co. 73
*Williams, J. H., & Co. —
†Williamsport Wire Rope Co. —
*Wilson Welder & Metals Co., The 38
†Wisconsin Malleable Iron Co. —
Witherbee, Sherman & Co. 95
Wood, Alan, Iron & Steel Co. 18
Wood, R. D., & Co. 53
*Worth Steel Co. —
*Wyckoff Drawn Steel Co. 39

Y

†Yoder Co. —
York Milk Machinery Co. 103
*Youngstown Foundry & Machine Co. 32
*Youngstown Sheet & Tube Co. 13

Z

Zanesville Malleable Co. 67



M·A HANNA CO.

PIG IRON
IRON ORE
COAL

HANNA